40

AYURVEDIC DRUGS

THE CHEMISTRY AND SOMETHING BEYOND



(THE INDIAN TRADITIONAL HEALTH SCIENCE
HAS TO BE ANALYSED IN A DIFFERENT WAY
FROM THAT OF THE MODERN SINGLE COMPONENT
DRUG TREATMENT SYSTEM - WHY ?)



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M.Sc. (Pharm. Chem); M. Sc . Chem) Ph. D ; D. Litt.
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Dhanyathman!

World over thinkers, scientists, and scholars are searching for new knowledge, ideas, concepts, processes , products and approaches. They are looking forward for getting the same from modern science. They are also looking backward for getting the knowledge from the ancient books and traditions. They are searching for old customs, rituals, books and all what are available to peruse into. Many ancient knowledge got wiped out with the respectice ancient civilization. However, in India in-depth knowledge on mathematics, astronomy, metallurgy, psychology, sociology, anthropology, spirituality, food science, physics, chemistry, health science, medicines, and so on exist. Majority of the knowledge accumulated during the last not less than ten thousand years in all branches of physical , chemical and biological sciences still exist here. The yoga, vaastu, music, Vedic mathematics, food science, manthras, etc are part of the ancient Indian knowledge.

Music is now used for music therapy (sangeetha chikitsa) , aromatic materials are used for aroma therapy (sugandha chikitsa), water for water therapy (Jala chikitsa)...... the vaastu concepts are being accepted by many people world over, strenuous modern gymnastic exercises are being replaced by yoga .... and like this many ancient knowledge are being adopted for making the life more comfortable

Ayurveda is becoming one of the best alternatives for the modern medicines. Many medical practitioners started integrating modern systems and ayurvedic systems for the benefit of both the systems. Yoga, martial arts, food, medicines, soorya namaskara (sun salutations), New Age Therapies, fasting, etc are part of the ayurvedic knowledge. In short Ayurveda is not dealing merely with diseases and health problems. It deals with an integrated concept of health which include psychology, sociology, anthropology, spirituality, tradition, custom, ritual, profession, food, family and social relation, and so on.

Here I am only attempting to present the Ayurveda in a nutshell, with my limited knowledge, for a common man. This is meant for giving only a preliminary understanding of some aspects of the subject. It may not give an integrated vision of Ayurveda. It will give some basic information on Ayurveda.

I submit this book at the feet of the great ancient Indian Rishies who could contribute both the scientific and spiritual knowledge and prayed *lokaa: samasthaa: sukhino bhavanthu.* Let all the people become happy world over. I wait for your comments and suggestions for including in the next edition of this book.

2nd October 2008 Dr. N. Gopalakrishnan

AUTHORS OF THE AYURVEDIC BOOKS AVAILABLE IN VARIOUS LIBRARIES / INSTITUTES

Book	Author
Agastya samhita	Maharshi Agastya
Ajeerna manjari	Anonymous
Abhidhana Kamadhenu	Anonymous
Abhinavarasasaastra	Somadevasarma
Anandakanda	Manthan Bhairava
Ayurveda Prakaasa	Madhav
Ayurvedeeya khanija vijnan	Kaviraaj Pratap Singh
Ayurvedeeya rasasaastra	Madhava
Ayurvedeeya rasaayana	Bhojaraja
Asava arishta	Satyadeva Vidyalankaar
Asavaarishta sangraha	Pakshadhar Jha
Kashaputa	Acharya nagarjuna
Kankalee	Naseet Shah
Kalyaana karak	Ugradhityaacharya
Kakachandeeswara thantra	Acharya Nagarjuna
Kamadhenu thantra	Anonymous
Kupee pakva rasa nirman vijnana	Harisaranaananda
Kouthuka chintamani	Pratap
Ksheerasindhu	Anonymous
Gandhaka kalpa	Anonymous
Goraksha samhita	Acharya Gorakhnath
Goureekanchalikaa thantra	Bhairav
Charpata siddhanta	Charpatee
Dodaranana	Dodarmaal
Thantraraj	Jaabaala
Thantrasaara kosha	Sankunath Datta
Thaamrayana	Muntee
Dhattatreya thantra	Dattatreya
Dattatreya samhita	Dattatreya
Divya rasendra sara	Dattatreya
Divya rasendra sara	Shanapati
Deveeyamala	Anonymous
Dhanvantari samhita	Anonymous
Dharaneedhara samhita	Dharaneedhara
Dhatu paddhati	Anonymous
Dhatumanjari	Anonymous
Dhaturatnamaala	Devadatta
Dhatu rasaayana	Anonymous
Dhatuvaad	Anonymous

Bavaratnadhatuvaad	Anonymous
Nagaarjuneeya indrajaal	Acharya nagarjuna
Naasatya samhita	Anonymous
Nootanakalpa Vaidya	Hariparapanna Sarmah
Paakavijnan	Paakaavalee
Paarada yogasaastra	Aamayogeendra
Parada vijnaaneeya	Judeva Bhayu Dev
Paradasaṃhita	Niranjan Prasad Guptạ
Parada samhita	Chittolbhava Swami Hamsa Raj
Purandar Rahasya	Jyeshtamala vyaasa
Pratyaksha oushadee nirman	Viswanath Dvivedi
Prayoga chintamani	Rama manikya Sena
Parambhik rasasaastra siddhanda	Misra
Bhandasarvaswa	Gorakhnath
Vaahat	Goureeputra Karthikeya
Bhoudhasarvaswa	Anonymous
Bhasmaparpatee	Deveesarana Garg
Bhasma vijnan	Harisarananda
Bharata bhaishajya ratnakara	Gopeenath Gupta
Bharateeya Rasapaddhati	Atrideva Gupta
Bheshajakalpana vijnana	Avadhavihari Agnihotree
Bheshaj samhita	Atrideva Gupta
Bhashajya ratnaavalee	Govinda Dasa Sena
Bhashajya saraamrutha	Upendra
Makaradvaja chandrodaya	Radhavallab Vaidya
Makaradvaja rahasya	Anonymous
Makaradvaja siddhayoga	Sambhoonath
Manthan Bhairava thantra	Manthan Bhairava
Maharasankusa	Ankusa
Mahodhadee	Sivanath Yogee
Yoga chandrika	Lakshmana
Yogachintamani	Anonymous
Yogatharaginee	Anonymous
Yogamaala	Yogasiddha
Yogaratnavalee	Nagarjuna
Yogaratnakara	Anonymous
Yogaratnakara	Anonymous
Yogasamucchaya	Vyasaputra Ganapati
Yogasara	Anonymous
Yogasudhaanidhi	Vandee Misra
Yogaamrutha	Gopaladas
Rasakaankaalee	Kankaal Yogee
Rasakalpatharu	Anonymous

Rasakalpalata	Narayana Misra
Rasakalpalataa	Manganee Ram
Rasakalpalataa	Kaseenath
Rasakashaya Vadyak	Vaidyaraj
Rasakamadhenu	Choodamaanee Misra
Rasakinnara	Anonymous
Rasakouthuka	Mallarai
Rasakoumudee	Jnana Chandra Sarma
Rasakoumudee	Madhava
Rasakoumudee	Golhadeva
Rasakoumudee	Saktivallabha
Rasajnaanam	Jnaanajyothi
Rasagovinda	Govinda
Rasachakra	Bruhaspati
Rasachandaamsu	Sankara
Rasachandrika	Neelambar Purohit
Rasachandrika	Madhava
Rasachandrodaya	Chandra Sena
Rasachikitsa	Prabhakar
Rasachikitsa vimarsa	Somadeva Sarama
Rasachintamani	Megadeva Soori
Rasachintamani	Anantadeva Soor
Rasajalanidhi	Bhoodeva Mukherjee
Rasatantra	Guha
Rasatantra	Veebhadra
Rasatarangamalika	Janardhana Bhatta
Rasatarangini	Sadananda Sarma
Rasatarangini	Vidyadhar Vidyalankar
Rasadarpana	Trimalla Bhatta
Rasadarpana	Anonymous
Rasadeepika	Anadanybhava
Rasanikhandu	Anonymous
Rasasidhanda	Anonymous
Rasanirmana vidhi	Acharya Aswaghosha
Rasapaddhati	Acharya Sree Bhindu
Rasaparamachandrika	Anonymous
Rasapaarijaata	Lakshmeedhara Saraswatee
Rasapaarijaata	Vaidyasiromani
Rasaprakash	Anonymous
Rasaprakasha Sudhakar	Yasodhara Bhatta
Rasaprakasikaa	Ramakrishna Sarma
Rasapradeepa	Ramachandra
Rasapradeepa	Nagadeva

Rasapradeepa	Prananaath
Rasapradeepa	Ravidhatta
Rasapradeepa (bruhat)	Sankar Bhatta
Rasapradeepika	Sreeprasantha Siddha
Rasapradeepika	Mangalagirisoori
Rasaprabhandh	Anonymous
Rasaprabhanda chandrodaya	Veesaladeva
Rasaprayoga	Anonymous
Rasabhodhachandrodaya	Anonymous
Rasabhairava	Bhairava
Rasabhaishajyakalpadeepika	Sooryapandita
Rasabhaishaayaratnaavalee	Sooryakavi
Rasamangal	Anonymous
Rasamanjari	Saleenath Siddha
Rasamarthanda	Anonymous
Rasamanasa	Dayarama
Rasamani	Hara
Rasamitra	Anonymous
Rasamitra	Anonymous
Rasamitra	Trayambakanath Sarma
Rasamuktaavalee	Anonymous
Rasayogamuktavalee	Anonymous
Rasayogasatak	Pradyumnacharya
Rasayogasagara	Vaidyaharipprapanna Ṣarma
Rasarajana	Anonymous
Rasaratna	Sreenath
Rasaratna koumudee	Anonymous
Rasaratnadeepika	Anonymous
Rasaratna pradeepa	Jangabahadur
Rasaratna pradeepa	Ramaraj
Rasaratna pradeepa	Anonymous
Rasaratna samucchaya	Somadeva
Rasaratna samucchaya	Vagbhata
Rasaratna samucchaya	Sankar
Rasaratnaakara	Nagarjuna
Rasaratnaakara	Devacharya
Rasaratnakara	Chakrapani
Rasaratnakara	Nityanath Siddha
Rasaratnavalee	Chandraraj Kavee
Rasaratnavalee	Gurudhatta siddh
Rasarahasya	Anonymous
Rasaraj	Lakshmeeswar
Rasarajapaddhati	Rajalakshamanasingh

Rasaraja mahodhadhee	Kapaalee
Rasaraj marthanda	Bhojaraj
Rasaraj Lakshmi	Sarvajna Bhatta
Rasaraj sankar	Ramakrishna
Rasaraj siromani	Parasurama
Rasaraja dushanidhi	Vrujaraja Sukla
Rasarajhams	Anonymous
Rasavarnana	Anonymous
Rasavaaridhee	Mandavya
Rasavidyaratna	Sivananda Yogee
Rasaviswadharpana	Harhara
Rasasaastra pravesikas	Bhadareenarayana Sarma
Rasasaastra	Atrideva
Rasasangraha siddhanta	Govinda Rama
Rasasanjeevasanwar	Hairbara
Rasasarveswara	Vasudeva
Rasasagara	Kshemaadithya
Rasasaaratrilaka	Yogee
Rasasaarapadhati	Anonymous
Rasasara sangraha	Gangadhara
Rasasarasamucchaya	Anonymous
Rasaaraamrutha	Ramasena
Rasasidhaprakasa	Madhavabhatta
Rasiddhi vimarsa	Somadeva Sarma
Rasasindu	Anonymous
Rasasudhakara	Anonymous
Rasasudhanidhi	Vrajaraja
Rasahrudayatanthra	Govindapadaacharya
Rasankusathantra	Chandranath
Rasarnava	Bhairavanath
Rasarnava	Nagarjuna
Rasadhikaara	Harihara
Rasananda kouthuka	Naravahana
Rasaamrutha	Jayadeva
Rasamrutha	Manikyananda Jaina
Rasavaloka	Sukraacharya
Rasendra chintamani	Dundukanath
Rasendra choodamani	Somadeva
Rasendra choodamani	Nakinchadeva
Rasendra tilaka	Chamunda Kayastha
Rasendra bhaskara	Bhaskara
Rasendra bhaskara	Lakshminarayana
Rasendra bhairava	Rasendra nath

Rasendra bhairava	Bhairava
Rasendra mangala	Acharya Nagarjuna
Rasendra samhita	Anonymous
Rasendra sara sangraha	Gopalakrishna Bhatta
Raseswaranidhi	Anonymous
Rudrayamathantra	Acharya nagarjuna
Lakshmeeswara thantra	Ananymous
Lohasarvaswam	Sureswara
Sarngadhara samhita	Acharya Sarngadhara
Sahasra rasadharpana	Mallaswamee

There are 42 Siddhanta Based Ayurvedic Books Available now. They are known in the authors name.

Aadima Siddhanta (Anonymous)
Lankesa Siddhanta
Kapaali Siddhanta
Bhaskara Siddhanta
Ratnakousha Siddhanta
Aravahana Siddhanta
Gomukha Siddhanta
Vyaasee Siddhanta
Nagarjuna Siddhanta
Nagabhodhi Siddhanta
Khanda Siddhanta
Brahma Siddhanta
Lampaka Siddhanta
Hari Siddhanta
Thaatwika Siddhanta
Munisreshta Siddhanta
Bhalukee Siddhanta
Nandee Siddhanta
Mandana bhairava Siddhanta
Nagabudhee Siddhanta
Vaishta Siddhanta
Chandrasena Siddhanta
Visarada Siddhanta
Matthamandavya Siddhanta
Soorasena Siddhanta
Sambhu Siddhanta
Indra Siddhanta
Bali Siddhanta
Kapalee Siddhanta
Surananda Siddhanta
Yasodhana Siddhanta
Kaapaalikaa Siddhanta
Govinda Siddhanta
Hari Siddhanta
Charpatee Siddhanta
Vanaasura Siddhanta
Rasendratilaka Siddhanta
Bhairava Siddhanta
Swacchandabhairaa Siddhanta
Kaakachandeeswara Siddhanta
Mahadeva Siddhanta
Kankalayogi Siddhanta

The above books give many ideas generated by ancient Indian scientists. They include the pure chemistry, metallurgy, salt preparations, diseases, diagnosis, treatment methods and variety of other informations. Many of them are valid today and some of them have become obsolete. Many hypothesis are given in the siddhanta books. The modern scientists, who are searching for ideas, processes and products should take these books as the source materials for conducting further research. They need not blindly follow any information given.

HEALTH SCIENCE, MEDICINE, DISEASES ETC.

It can be seen that almost all the Rasa based books carries in their second part, the health based information, both diseases and the treatment methods. This also include the diagnosis, pathyas or control of the life style, etc. Another important subject matter in the above books is processing of drugs in small and large scale. We discuss few books for getting some information.

SUSRUTHA SAMHITA OF SUSRUTHA MAHARASHI

The book starts with the explanation on the aim of the Ayurveda and the principle followed in the diagnosis and treatment of the diseases. The date of composition of the Susrutha samhita, the authority of the book, the scope and subdivision of the Susrutha samhita are further explained and then the concepts and theories connected with the science of health.

Ayurveda's relation with cosmic evolution, embryonic concept of body, life and soul, rules and the principles of genetics are discussed in detail.

The vata, pitta, kapha principles of the body which is known as tridosha siddhanta, the sleep, dream and their effect, time and age of an individual, are discussed further.

The embryonic growth and obstetrics and post natal measures are further discussed in detail giving specific importance to each and every point. The anatomy and physiology of human body are discussed.

The food, food value of different edible and potable substances and their use in health and curing the diseases, the merits of vegetarian and limitations of non vegetarian food are also discussed in detail.

Health and longevity, hygienic rules, care of eyesight, the three states (childhood, youth and old age) of man, anatomical features and physiological characterstics, rejuvenation and longevity are discussed with great accuracy and looking into minute points.

The diseases, their origin and classification, diagnosis symptoms indicating the imminent death, fundamental principles of ayurvedic treatment, some diseases meriting special mention, dental diseases, mental and psychic disorcers, etc. are further discussed with more details (in the 9th part of the book.)

In the tenth and eleventh part, poisons and antidotes and some special reciepes are discussed.

In the 12th part, the creatures and their classification are the subject. One can see how seriously the ancient Indians have looked into each of the subject.

Plant classification, ecology, morphology, taxonomy are discussed in the 13th part.. And 14th part carries the information on the pharmacology and materia media of the health science, medicines, applications of medicinal preparations and some selected medicinal preparations.

The 15th part gives discussion on surgery. General principles and methods of practical surgeory, surgical instruments, surgical importance of certain vulnerable parts, special surgical methods, ophthalmic surgery, dental surgery and post surgical measures are included in the descriptions.

In the 16th part convalescence and their causes remedies are discussed, and in the last part, the explanations on the training methods, duties of the physicians, surgeons and nurses are given.

CHARAKA SAMHITA OF MAHARSHI CHARAKA

This is a very important ancient book on Ayurveda similar in content and explanation to Susruta samhita. All the divisions as sthanas are given in this book also.

Soothrasthaanam : Learning of Ayurveda, Ayurveda as the upaveda and its methodology of presenting the information, materials and their properties, body and mind, the thridosha siddhanta and its explanation, the medicinal extracts and decoctions, variety of oils, salts, decoctions, medicinal plants, etc are mentioned as the abstract informaton.

Medicines used for vomiting/vamana and for many other purposes like, curing vata, head injuries, fever, body ailments, etc.

Nineteen types of mahakashayass which are (decoctions) and their specific uses. Detailed description on the food, smoking, the bad effect of smoking the poisonous materials and good effect of using the ayurvedic drugs for smoking, which is also a method of treatment are discussed.

Use of special type of medicated oils at different times, different ages, before or after different customs and traditions and also for different parts of the body are discussed in this part.

Body care, change of food, different customs and traditions to be followed, use of varying garments, etc, during seasonal variations are discussed.

Process of treating each diseases and how to proceed in the diagnosis are first discussed in this part and then five sensory and functional organs, panchabhoota, pancha prana, etc. are mentioned with physiological and spiritual background.

Collection of the correct proof, intensive observation of a patient and comparing with his own health, the method for noting the healthy and unhealthy state through variety of techniques, effect and merits of exercise, apt exercise for men and women at different ages, other conditions, the

quality of a physician-drug-nurse-material and surroundings, the diagnostic method through direct and indirect observation for certain specific diseases, classification of drugs and physicians, the illness connected with vayu (vata which is) one of the components of tridosha are discussed in detail here.

Properties and medicinal effect of variety of oils when used directly or used after further converting into medicated oils, detailed description of the treatment in which the sweating techniques are adopted, treatment in which cleaning the intestine by purgation and vomiting techniques description of health, opinions of different Rishies on the cause and effect of diseases and ill health are discussed.

Variety of diseases like those caused by worms, micro organisms, due to bad food, diseases connected with bowels, urinary bladder, reproductive organs, lungs, their symptoms and many diseases are explained here.

Diseases of lean and fat individuals, sleeping and limitless sleeping as a symptom of good/ill health and the theory and effect of sleep are described in detail.

Detailed description of blood and blood based diseases, varitey of extracts used as food and their merits, extracts of leaves, fruits, seeds, barks, vegetables etc., are all included in this list.

Food and qualities of the food to be maintained for good health, various types of cereals, pulses, meat products, various birds' meat, vegetables, roots, fruits, different types of fermented food/liquid, milk and fermented milk products of various animals, various types of water collected from different sources, the sweetening agents, causes and bases of diseases, etc. are explained in the soothrasthanam part of Charaka samhita, as given in the above order.

Nidaanasthaanam : as mentioned earlier each and every part of Charaka Samhita describes in detail various topics precisely. Here the description of jwara nidanam on fever, raktapitta nidhanam or blood based diseases, prameha nidanam pancreas based, kushta nidanam, unmada nidanam, apasmara nidanam,.... like this, illness are described very systematically with specific classification.

Vimanasthaanam : Detailed description of six rasas (flavours), curative effects of various flavors from different materials, quality parameters to be followed for every medicinal components depending upon the place, time and season of collection and processing. The importance of drugs and counseling in the treatment, three types of special knowledge about the illness (nature of patient-diseases-drugs to be used), psychological diseases, etc, are also given.

Tests to assess the knowledge of the students and examination, evaluation of the text books prescribed for the studies, the examination for Ayurveda teachers and students, tests for understanding the analytical capacity of the physician and students, the method of learning and teaching Ayurveda, the ethical points to be followed by a physician, the method to be followed for discussion, the plêdge to be taken after completing the academic course as a physician, the viva voce examination and evaluating viva voce method based on 25 ways of expression and answering by a student, etc. are systematically presented.

Sareerasthanam : Various types of human body and its nature, the body and mind, the body - mind and jeevatma relation, the cause of happiness and unhappiness, disproportional body, the conceiving and the development of embryo in the womb of the mother, problems of growth during different periods in the womb, the masculine character of the body, the body (janma vasana) character special qualities of specific individuals, detailed description of pregnancy and the development of the embryo-human body-in the womb of the mother, details of the baby/embryo, heart beat of the baby, death of baby in the womb, birth, namakarana, jathakarma, milking of the baby, disinfecting the dresses of the day, cleaning of the resting places of baby, the information connected with the newly born baby etc. are descried very systematically. In short the sacraments connected with baby are the subject matter here.

Indriyasthanam : Body, organs, sensory and functional organs, the prakruti and vikruti of the body, analyses of ears, eyes, teeth, skin, nose, etc., and the connected diseases.

Chikitsasthanam : medicines, the method of curing and treatment, variety of ayurvedic drugs and their components, gooseberry, various rasayanas, rejuvenation of the body, treatment of the fevers, blood diseases and treatment, diabetics, leprosy of various types, blood pressure, epilepsy, psychological problems and teatment, anemia, weakness, stomach based problems and treatment, skin diseases, lungs problems, vomiting and dysentery, treatment for poisons, injuries-wounds-skin related problems, paralyses and Parkinson's diseases, sex diseases and those connected with sex organs, are described in details specifying each and every point in the analyses, diagnosis and medicament.

Kalpasthanam : variety of kalpas of making the drugs, their applications and uses for specific health problems are described here.

Siddhithanam : panchakarma, vasti, netra vasti, etc., are described including variety of special treatments.

Thus the Charaka Samhita explains very systematically almost all aspects of health. This book might have composed probably 2500 years

ago, whereas the subject matters in the same pattern were codified much earlier. It is mentioned that the father of the modern medicines, Hoppocrates, studied the science of medicines, using the Susrutha samhita and Charaka samhita.

ASHTANGA SANGRAHA OF VAGBHATACHARYA

The period of Vagbhatacharya is supposed to be somewhere between 1st century AD and 3rd Century.

In Ashtanga sangraha also the subject matters are classified into soothrasthana, sareerasthana, nidanasthaana, chikitsasthaana, kalpasthana and uttarasthaana. Totally there are 150 chapters and the unique way of presentation of subject matter in Ashtanga sangraha is the specialty of this book. Here the author has meritoriously presented the information in sootras as done by Patanjali in ~~the~~ yoga sutra. Vagbhatacharya has taken the authentic subject matter for the body treatment from Charaka samhita and for surgery, he has followed Susrutha samhita. Of course he has further improved and simplified the subject matter. At random he has also given statements in prose for describing th subject matter other than the poetic method of presenting.

Many commentaries are available for Ashtanga sangraha and also many additions and modifications were done by others to improve the subject matter.

ASHTANGAHRUDAYA OF VAGBHATACHARYA

In this book the subject matters are presented as follows: sootrasthaanam, sareerasthanam, nidanasthanam, chikitsasthanam in which the kayachikitsa (treatment for the body) balachikitsa (child care and treatment) grahachikitsa (mainly connected with mental disorders and some diseases presumed during those days based on planetary position in the horoscope), urdhwanga chikitsa (treatment of the body parts) and salyachikitsa (surgery). Then the kalpasthanam and uttarasthanam are described, as mentioned in the ashtanga sangraham.

The details given in Charaka Samhita and other books are further improved and said to be presented in more systematic methods in Ashtanga hrudaya.

Here, on each and every aspect of diagnosis and treatment, the opinion mentioned by the acharayas of earlier works were quoted and then the irrational views were removed giving logic conclusion and then the authors view points are presented. After giving the rational basis of selection and diagnosis, he tells that "this is not my opinion, but the opinion given by great ancient Rishies".

The selection of drugs are done with utmost care, the explanation

given on the treatment through vamana and samana are very interesting to understand and analyze. Every modern physician should read this book to many information.

About the authorship of the book, there are many opinions. As the student of Indian heritage we need not bother too much about the authorship, if we are interested in the subject matter only.

Other than Charaka Samhita, Susruta Samhita, Ashtanga hrudaya, Ashtanga sangraha, the books connected with rasa chikitsa give detailed description of the body, diseases and treatment methods. For citing the examples a few explanations are given below.

RASARATNAKARA

Description of plant produts, variety of natural inorganic and organic poisons etc. are given in the 10th chapter of Rasaratnakara.

In the 11th chapter, the qualifications of a doctor, student, patient, nurse, rajavaidya, and diagnostic methods, different types of ailments, etc., are mentioned and also thridosha siddhanta in detail. Treatment for the three types of patients are given. From here onwards description of the treatment is given upto the last chapter of the book.

Variety of diseases connected with lungs, sound box, blood, heat, liver, intestine, digestive systems, epilepsy, urinary problems, stomach problems, body ache, leprosy, bone problems, chicken pox and small pox, ophthalmic problems, specific problems related with women, babies and old people are described.

Fever, typhoid, anemia and infectious diseases due to microorganism and worms, contagious diseases, etc., are also mentioned with their symptom and diagnostic methods.

RASARATNA SAMUCHAYA

From 13th chapter onwards, the health, diseases and curation are described in this book. Cancer, lungs problems, typhoid, TB, vomiting, heart problems, stomach-intenstine-liver-pancreas-ailments, urinary bladder problems, sex diseases, ear-eyes-bone-intenstine-problems, etc., are described upto 26th chapter. 26th chapter is exclusively for rasayana chikitsa, 27the chapter for vajeekarana or rejuvenation, 29th chapter exclusively deals with poisons, and 30th chapter devoted for mercury based drugs and treatments.

RASENDRA SARA SANGRAHA

The second chapter of the book is fully devoted for the diseases and treatment using chemicals, i.e rasa chikitsa. Here description is given as follows: Jwara and its treatment, various types of fevers, various types

of contageous diseases caused by worms and microorganisms, treatment for breathing problems, epilepsy and convulsions- bile related problems, skeletal joints, heart problems, urinary problems, diabetics, leprosy, hyper acidity, ear-nose-throat-neck-eyes-head-brain-problems etc.

The third chapter discusses the subject of diseases for the children as known now as pediatrics/child specialist. The fourth chapter is the treatments for poisons and the fifth chapter for rasayana vajeekaranam.

RASA CHANDRIKA

In the first part of this book, detailed description and treatment for diabetics, the stomach problems and for few other diseases are given. The rest of the book describes only on furnaces and processing the rasas for using as medicines.

RASARNAVAKALPA

Rasarnavakalpa is a text book of 10th or 11th century AD. The first part of this book, as explained earlier gives details of metallurgical process and the use of the metal and their compounds for treatment. In the second part in 77 verses, explains the tantric method of rasayanas and their benefits. From 78 to 207 verses discussion of the mercurial preparation for the treatment of variety of diseases are given, from 213 verses onwards the use of medicinal plants are given with and without minerals and metals.

The order of further discussion in this book is as follows, the mercury and its various preparations used as such or with other products for treatment. Medicinal plants and classification of medicinal plants. 64 families of the plants are explained here. The medicinal preparations of metallic compounds using rubbing, roasting, heating, steaming, digesion, calcinations, filtration, etc., are explained.

The use of abraka/mica as medicine, and other chemicals used for the same purpose like, kanta loha, cinnabar, makshika, gold pyrites, lead compounds, copper compounds, orpiment, borax, iron pyrites, etc., are explained.

INORGANIC CHEMICALS USED IN AYURVEDIC DRUGS AND THEIR PREPARATION

After discussing the plant products / raw drugs we shall gust glance through the chemicals used in Ayurveda. There are many ancient books written about chemicals. The books describing the rasa method of treatment also contain details about chemicals and their preparations.

Some of the books coming under the above category are Rasendra mangala, rasarathnakara, karshaputa, lohasastra, kakachandeesvarathanthra, etc. Yogaratnamala of Nagaraja of Vikramasila, Rasarnava, the 12th century text by Ghorakanath has detailed decription

on manthra, thanthra, yanthra and the second part known as bhoothiprakarana has completely devoted for the chemistry.

Rasendra choodamany is the .12th century book written by Acharaya Somadev, Description of Rasoparasas, ratna pareeksha etc are also described in this text.

Rasprakash sudhakar is the 12th century book by Acharya bhatta. There are 13 chapters in which mercury, Rasaparasas, Sadharana rasas, yantras, mooshas metals and precious stones, like emerald, diamond, etc.... are described. Their oxides, sulphates and the camphor, safforn, etc are also included in the text.

In the fifth khanda of the above book detailed description of the mercury, its extraction, complex formation chemistry, etc are mentioned.

Rasahrudaya is a book written in 13th century, by Acharya Kankal yogi. He has described in his book, about the mercury, silica, sulphur, camphor, mica, compounds of the above, etc,

Rasachintamany is a book in which the mercury processing method is given. This is a 15th century book written by Acharya Ananda Dev. Here 177 types of oxides used in curing the diseases are mentioned.

Rasendra chintamany and Rasamanjari are written separately by Dumdumkanathan and Salinathan describes in details the medicines prepared from chemicals.

Bhavaprakasha is the 16th century book written by Acharya Bhava Misra having two parts poorva kanda and uttara kanda. Detailed description on various metals and their products used in the treatment is given here.

Rasakoumudi is written by Jnanachandra in which four parts describe in detail, the science of chemicals including mercury, suphur, silk, mica, silica, etc.

Rasatharangini by Sree Sadananda sarma : The book starts by describing the qualities of the Rasa teacher and the student, teacher student relation, explanation of a perfect laboratory, instrumentation room, translation and glossary of the chemical words of Sanskrit, classification of crucibles, furnaces, and process in relation with the chemical processing, Different types of yantras such as dola-urdhwapaata-adhapaata-thiryakpaata-bhasma-kacchapa-bhoodhara-mrudanga-baaluka-lavanaputa-yamtras-used for different types of processing such as filtration, evaporation, condensation, sublimation, oxidation, filtration using cloth, sand bath heating, solidification, crystallization, heating, etc. Variety of puta yantras which are used for heating the materials are thus described: ishtika jarana somanala hamsapaka naabhee dhoopakoshtivalabhee swedana paatanaushna yantraa: which are used for sand heating, direct

heating, flame heating, boiling, smoking, steam heating, sublimation type of heating, warming, etc.

Variety of processing for the mercury and other materials are described here as sodhana, mardhana, moorchana, paatana, urdhwapaatana, adhapaatana, bhodhana, niyamana, deepana, jaarana, etc

The extract of many materials are described mudgarasa, rasapushpa, rasakarpoora, rasaarpatika etc.

Then the processing of mercury, processing with Mercury, Parada marana, rasasevana, etc., the descriprtion of sulphur processing, etc are further described and sulphur oil, sulphur water emulsion etc.

Variety of hingula, production, various processing, etc.

Abhraka (mica) is described as nagaa bhraka, mandookabraka, vajrabhraka and variety of processing with mica.

Harataala, thalaka, paatra thala, thaalasodhana, thaalaka, etc are described in detail. The conch shell powder, making fine powder, properties, uses, etc making variety of drugs using the same.

Preparation of a variety of oxides known as kshaara arka-thila-apamrgansuhika kshara palaasa kshara, saindhava kshara, samudra lavana kshara, etc.

Detailed description of gold and salts of gold are described in the 5th chapter. Similarly, detailed description of silver is given. Description of copper, including metallurgy as in the other cases, tin metal, lead, iron, gold related alloys are described in the next series of chapters, including gold ores, metallurgy, purification, application properties and their medicinal uses. In the 21st chapter the description of sulphates of gold, copper, silver, tin, lead, and zinc and 22nd chapter 22 types of brass are given.

Many types of jewels are described in the 23rd chapter including precious stones of different variety.

The 24th chapter describes the poison of natural origin minerals and organic types. Thus ends the rasatarangini.

Rasaratna deepika : This text book describes the production of mercury and their properties and the properties, and medicinal application of gold, silver, çopper, zinc, sulphur and a variety of their alloys. The medicines, their application and the precautions to be taken for the application/ consumption of the rasa based medicines are clearly mentioned in the book.

Rasendra Sarasangraha of gopala bhatta : Cassandra sarasangraha is a 13th century chemistry and health based science book. The first chapter of the book describes the mercury and detailed processing techniques of mercury, including the extration and purification. In the second

part, the processing of sulfur and compounds with sulfar are described Then the vajra processing and manasila processing are explained processing and compound formation with silica, mica, sulphates, iron oxide, arsenic oxide, etc are given as vimala sodhana-kaaseesa soodhana-maakshika sodhana-sila sodhana-tangana sodhana-swarna, rajat, thmra, loha sodhanas, etc.

Further description is on the health science and medicines which are given in the respective portion, below.

Rasakamadhenu : The chemistry book of the 17th century gives detailed description of the yantras instruments-used in chemistry in the first part Followed by this, the mercury processing, detailed descriptions of various types of poisons classification of materials, quality of chemistry teacher, student, laboratory assistant and making of laboratory or workplace, etc are given.

Explanation of the iron, gold, silver, copper, zinc, lead brass and alloys of these metals and their properties, quality description of vrious types of metals and alloys are also given. Then the extracts of natural products and their compounds are given, with reference to curative effect also.

Variety of processing methods like heating, vaporization, sublimation, direct and indirect heating etc. are also described in the end of the book.

Rasachintamani : Variety of oxides of metals and their alloys are described in the first part. The plant products and the combination of various types of chemicals and their curative effects are explained further.

SANSKRIT NAMES AND SYNONYMS OF MEDICINAL PLANTS

For each and every medicinal plant there are many Sanskrit names Each name also carries a special meaning conected with that medicinal plant. Presented below is the selected list of a few important medicinal plants and their Sanskrit names.

Augusta : *agasti: agastidru, munitaru, vangasenaka:*

Eagle wood : *agaru, krumijagdham, yojakam, rajarham, pravara, vamsika, krumiham*

Alangium : *ankola, kolaka, rechee, deerghakeelaka*

Sphaeranthus indicus : *hapusha, munda, mahamundee, bhikshu sraavenee, thapodhana*

Aconite : *athivisha, kasmeera, prathivisha, aranyaa, stungika mahaoushadha, visharropa, amrutha, swethavachaa*

Rauwolfia serpentina : *sarpagandha, nakulee, sarppadanee, rakthathrika, kukkutee*

Tinospora cordifolia : *guloochi, chinnaruha, chinnolbhava, valsaadanee*

kundalana, amrutavallee, amruthalatika, bhishakpriya, madhuparni.

Nerium indicum : *karaveera, aswaghana, aswamaara, hayamaraka*

Marking nut tree : *bhallathaka, agnimukhee, aarushkaram, ashkara, bhallee, Asoka tree asoka, anganapriya, hemapushpa, thamrapallava, gandhapushpa, vanchula, kankoli.*

Malabar nut tree : *Vaasa, vaasaka, vrushaka, simhasya, vamsa, Vishnu, vajeedanta*

Prickly leaved elephants fruit : *gojihwa, gojihwika, gobhi, daavika, khara, parnini.*

Neem :*nimba, arishta, hinguniryasa, manda, abhidhana, thiktaka*

Sacred fig : *aswatha, pippala, ksheeravruksha, chalapatra, bodhivruksha, kesavalaya.*

Country fig: *udumbara, jantuphala, sevya, kruphala.*

Castor oil plant : *ernda, panchangula, vaataari, deerghadandaa, kumbhee, gandharva hstha, tharuna, vardhamana, rumbaka.*

Indian elma : *chiribila, putrikaranja, karanja*

Ginger : *srungaveram, suntee, nagara, mahaoushas adhee, ardhra, sakam.*

Lemon grass : *kaarpoorathruna, sugandha thruna*

Salmali/red cotton tree : *saalamalee, pischila, rakthapushaka, sthiraaya, mocha, pooranee, kantakadruma*

Moura butter tree : *madhuka, theekshana saara, vatarastam, madhusrava, swadupushpa.*

Indian berthwort : *gaarudee, ahigandha, rudrajaata, sunada, eeswari, arkamoola,*

Indian beech : *karanja, nakatamaala, guchapushpaka, ghrutapura, snigdapatra, krumimardhana, udakeerya*

Deveils apple : *dattura, dhoostura, unmaanttha*

Balloon wine : *karnaphota*

Maddar : *arka, sooryahwa, viksheera, ksheeraparnee, asphotam, vasuka, bhaskaram, ravi, mandaram, alarkam*

Mexican poppy : *swarnaksheeri, haimavatee, brahmadandee, parnee, peetadughaa.*

Gingelly : *thila, sneharanga*

Cardamom : *elm, sookshma, draavidee, upkunjee, sookshmylaa*

Devil tree : *saptaparna, visalatwak, chatraparnee, saaptachada, vishmacchada,*

Ionidium saffraticosum : *amburuka, padmacharinee, avitha, lakshmi, sreshta, sarada.*

Kampferia galanga : *sati, gandhamoolaka, draavidaka, kaalpaka, palaaka, chandaa.*

Indian hemp : *vijaya, sidhapuri, bhanga, harshana, maathulani, bhangi.*

Prickly chaff flower: *apaamarga, mayoora, sikharee, markatapippalee, durgradha, karamanjari, indulekhaa.*

Chembulik myrobalan : *hareethakee, abhayam, pathya, jeevapriya, rohini, chetakee.*

Indian labernam : *aaragwadha, nruendra, kruthamala, raajavrukham syaamaa, chaturangulam deerghaphala.*

Wilk egg plant : *kandakaree, nidighika, durpradharsha, kshudrakandika, vyaaghree.*

Bettel nut : *puga, pugaphalam, kramuka, guvaka, ghonda.*

Eclipta alba : *kesaraja, bhrmgraja, kunlavardhana, bhrunga, angaraka, kesaranjana*

Strobilanthus heyniyanus : *saireya, sahachara, daasi*

Monochoria hastaefolia : *neelolpala*

Five leaved chest tree: *nirgundi, sindhuvara, neelamanjaree, indrasu, rasa, indranika, bhootakesi, neelikaa.*

Clove : *lava: varaa, devapushpa, bhrunga, sreeprasoonaka*

Heatid cassia : *chakramarda, prachanda, dadrughna, prapunnata;, mesha, lochana, padmata, edagaja, chakree.*

Sandal wood : *sreekhandam, swethachandanam, chandanam, hima:seetam, seetham, gandhadyam, bhadrasree*

Onion : *rajapalandu, drugndha, mukhabhooshana, yavaneshta*

Clerodendrum serratum : *bharngi, Barbara, fanji, brahmika, kasajil, brahmayashti.*

Lime : *nimbuka, jambhaka, jambeera*

Green gram : *mudga, simbisreshta, varnaha, rasotthama*

Erva lanata : *bhadrika, gorakshaganja, kurandaka*

Nutmeg : *jatji : Jatikosa : malateephala:*

Jamun tree : *jambavam, mahaneela, phalendra, surabhee patra, neelaphala, mahaskanda, nandee, rajjamboo*

Boerhavia diffus : *purarnava, punarbhava, sophaghnee, varshaabha:*

Downi christia : *dhathakee, agnijwaala, dhatraupushpee, dhatupushpee, bahupushpika*

Bahera tree : *vibheetika, vibheetakee, anlaghnaka, aksham, kalidruma:, bhootavasa*

Lotus : *saraseeruham, rajeevam, pushkarasikha, ambujam, kamalam,sathapatram, padmam, nalinam, aravindam, sahasrtapatram, pankaroohąm, kusesayam.*

Long pepper : *pippalli, upakula, Krishna, magadha, vaidehi, kana, krukala*

Lencas aspera : *dronapushpee, chitrapatrika, phaleph ushpa, kabhapriya, drona.*

Holy basil : *manjari, krishnatulasi, surasam, gramyaa, surabhee, bahumanjari, bhootaghani, devadundubhi, tulasi.*

Ixora : *raktala, paatalee, paaranti*

Touch me not : *lajjalu, raktapaadi, namaskari, sparsalajja, kharatwak, sankochini*

Indian rubarb : *trivruta, tribhandee, sarala, triputa: suvaha, rechanee, nisotraa*

Indian sarasaparilla : *saribaa, ananthamoola, gopavallee, dhavala, gopakanyaka, krusodaree, gopa*

Cowhage : *ajada, kandoora, pravrushenya, sukasimbee, kapikacchu, markatee, kulakshayaa*

Black musali : *thalamooli, thalamoolika, thalapatrika, bhoothali, hamsapadi, dheerghakandika*

Country chiratta : *bhoonimba, kiratatikta, katutikta, thiktaka*

Indigo plant : *neela, neelini, neelika, tutha, graminee, ranjini*

White murda : *arjuna, kokula, partha, indradruma, dhavala, veeruvruksha, nadeesaraja, karuveera, krishnasarathi, arjuna, kaahu, ahua*

Crateva : *varunam, pasugandham, asmareeghna, thikta*

Purgiong croton : *jayapala, dantibeejam, kumbhee, dravanti, tinthrideephalam.*

Seesling tree : *sireesha: phanji, kapethana, sukapushpa, sukataru, mrudupushpa,*

Indian gooseberry : *vayastha, dhatri, dhatriphalam, amruta, aamalaka, vrushya, sivam*

Cottonplant : *karpasikaa, samudranta, sarinee, guda, badari, tundkeri*

Indian trumpet floer tree : *syonaka, aralu, deerghvrutta, pruthusimba, tuntuka*

Chey root : *parpat, jwarghna, sookshma patra, seetapriya, pittari*

Cyclea peltata : *paatika, ambashtakee, varatikta, aviddhakarna, tamgnee, paataa*

Kaligottu : *patala, krishnavrunta, tamrapushpee, kuberakshi*

Finger leamorning glory : *ksheeravidaari, ikshugandha, bhoomimanda, payaswinin, vrushyavallika, ikshuvalli.*

Bitter guard : *susavi, karavellaka, karavella, katillaka:*

Imula rcemosa : *pushkara, padmapatra, poushkara, pushkara, sipha, pushkaramoola, kashmeera, kushtabheda.*

Indian sorel : *amlika, chagery, sargheri, dantasata, amlaruha*

Umbrella tree : *gardabhandam, parisha, kamandalu*

Chonemorpha macrophylla : *madhusroni, dhanurmala, murva, murva, madhusava, murvee, dhanuguna*

Flame of the forest : *palasam, kimsuka, raktpushpaka, kshara, sreshta, brahavruksha*

Bacopa monnieri : *brahm thrayantee, seetakamini, bhekaparnee*

Indian maddar : *manjishta, vikasha, samanga, rakthangee, raktayashtika, kaalamishika, yojanavalli, vastrabhooshana*

Turmeric : *Haridra, gouri, rajani, varangee*

Tree turmeric : *daruharidra, kaleeykiyam, peetadaru*

Coriander : *dhanya, chatra, vitunnakam*

Pomgranata : *dadimam, daadima, kuchaphala, dantabeejaka, lohitpushpaka*

Horse gram : *kulatha, kulatthika*

Nut grass : *mustaka, varida, musta, jaldhara, ambudhara, Ghana, payodhara, kuruvinda, kuruvid/ndwakhya, mothoa, nagaramotha*

Grape vine : *draaksha, mrudveeka, gosthana, swaduphala, amrutaphala*

Drum stick : *sigru, sigrujam, sobhanjana, akshiva, mochaka, theekshanagandha*

Climbing lilly : *longalika, sakrapushpika, agnisikha*

Wawrung : *vidanga, krumighna, krimiripu*

Garlic : *iasunam, urgagandham, bhoothaghna, mlechagandha, yavaneshtam, melchkandhu, rasona.*

Indian kino tree : *bandhuka, peetasala, asana, bandhukapusjspa, petakam*

Butterfly bean : *ankapushpee, gavakshee, sankaahwa, mangalya, devkusuma, girikarnika aparajita*

Asparagus racemosum : *satvari, abheeru, narayanee, sahasraveerya.*

Walnut : *akhobha, phalasneha, rekhaphala, vatghni, vrudhaphala, parvateeya, gudasaya*

Vithania : *aswagandha, turagagandha, gajeeganda, hayagandha, varaha, varada,*

Bishops weed : *agni, agnika, ajamodaka, deepyaka, khaaswa, yavanika, bhoomidambaka*

Birth wort : *keetamari, dhoomrapata, nakulee*

Water lilly: *kumudam, pundareekam, rajeevam, indeevaram*

Licorice : *yashtimadhura, kleethaka, athirasa, madhusrva*

Cinnamon : *thwkptra, tamala, tamalapatram, chocha, varanga*

Tooth brush tree : *bruihat pilu, gouri, lakhupilu, madhupilu, mahaphala, mahavruksha*

Fenugreek : *methi, methika, bahupatrika, bahubeejam, gandhaphala, vallari, kunjika, deepana*

Country mallow : *atibala, balika, balyam, ghanda, vatyapushpee, bhooribala*

Zachum oil plant : *ingudi, thapaataru, putigandha, kandakeetam, angarapushpa, kandakeevruksha.*

Round sidory : *satee, karchoora, suganghamoola, dravida, gandhasatee*

Mustard : *rajika, asuree, theekshanagandha, arsapa*

Dark catechu : *khadir, kushtari, raktaaram, danthadavana, yajnanga, bahusalya, gayatri*

Caraway : *krishnajeeraka, bahuguna, krishnajaji, kat neela*

Quasia indica : *neelavruksha, neelasara*

Palmyra plm : *thala, aavadruma, dwajadruma, deerghaskanda, duraroha, lekhyapatra.*

Babul : *baboola, baboolika, barbura, pootimeda, deerghakandaka, peetapushpa, sookshama sakha,*

Spurge : *snuhi, samanthadugda, vajra, sehundam*

Bonduc tree : *kuberakshi, lathakaranja, grutakaranja, ksheerinee*

American worm seed : *chivillika, goudavstuaka, sugandha vastuka*

Indian borage : *adhopushpi, surasam, romalum, avakapushpee, dhenujihwa*

Asafoetida : *hingu, sahasravedi, ramata, asugra, jantughana, agoodagandham, jarana*

Bengal current : *karmada, avighna, krishnapaka, krishnapanaphala, drudakandaka,*

Babchi : *vakuchi, somarajee, suvalli, somavallika, avluguja, krishnaphala, putriphala, chandalekha, durgandha, kalameshi, kushtanasini,*

kaphanasini, putiphalee, bhookesi, bakuchi.

Chireta plant : *kiratatikta, haima, kandatikta, bhonimba, mahatikta, chiayata*

Safron plant: *kesara, kunkum, ghusorna, rakta, rudhir, kashmira, aruna, deepaka,*

Malabar tamarind : *vrukshamla, phalamla, raktasamjna, amrutadrumba, rasamlam, savedhi, tanthrini*

Henbane : *paraseekayavani, yavaneeyavani, thrivagandha, madkarini, syamakubera, ruruksha*

Thach scare pine : *Ketkee, chamarapushpaka, dhooleepushpika, deerghapatra, gandhapushpa, indukalika, jambuka, kandadala, ketaka*

Costus : *kushtam, pushkara, kasmeerarajam, vapyam, rogam, agada, vyadhi, ulpalam, pakalam rucha, visha*

Ivy guard : *bimbi, bimbika, danthachadopama*

Gumnema sylvestris : *ajasrungee, madhulika, madhunasinee, meshsrungee, tikthadugda.*

Indian mahagani : *tunee, kubera, nandeevruksha, kaccha, peetatuni, mahanimba, kanakam.*

Brazil wood : *bhavya vruksha, kuchandanam, lohitam, patanga, ranjanam*

Champa : *chmpaka, athigndha, champeya, sukumara, hemapushpa, seetalacchada, kanchana*

Indian senna : *sonamukhee, bhoomichari, markandika*

China root : *dveepanthara vacha, madhusnuhi*

Flax seed : *rudrapatnee, ratnaptr, neelapushpa, suvarchala, uma, athasee, masruna.*

Indian night shade : *akrantha, bruhatee, kandakini, kshudravarthakee, simhee*

Muskroot plant / jadamansi : *jadamamsee, bhotajada, jadila, thapaswini, sulomasa, nalitha, krishnajkada, mashika, misi*

Purple lippa : *jalapippali, srdee, sakuladini, malsya gandha, languli, bahusikha*

Cumin : *jeeraka, ajajijee, jeerana, kana, deerghajeeraka, hrudru, deepyaka, manojna, ruchya.*

Gokru : *gokshura, gokshuraka, bhaksharaka, gokhuru, gokuandaka, shadanga, kandapatrika, vanasrungada*

Star anise : *kakkolam, kokkola*

Indian valerian : *thagara, kalamsarakam, kutila, chkra, barhana, kshtra, rajaharshanan.*

Himalayan silver fir : *thaleesa, thaleesam, thaleepatram, patrakhyam, dhatreepatram, neela, sukodaram*

Fagonia arabica : *durlabha, danvyasa, thamramoola, dusparsa, samudranta, kaccharu, sookshmapatra, harivigraha, anantha*

East Indian rosebay : *nandeevruksha, ksheerika, ksheeri, kshayadruma, nandyavarita, thagarachandanee, cishnupriya, chameliu, chandini, thagara.*

Indian squill : *vanapalandu, kolakanda, krumighna, pancjalam, putakanda, suputa.*

Iron wood tree : *nagakesara, nagapushpa, kanakahwam, hemakinjalkam*

Strebulus asper : *rukshapara, peetaphala, sakhotata, asshadoorta, bhootavruksha, gavakshee, karkasacchada.*

Soapanut tree : *arishta, phenila, gucchaphala, reetaa, somavallika, reeta karnja*

Ribbed guard : *thikta kosataki, dhamargava, dharaphala, kosatakee, krutacchidra, thikta, deerghaphala, jalini, karkotakee, devatala, jeemuta jinga*

Tobacco : *dhoomra patra, thamalam, maboolaka, ksharpatra, vajrabhrungee, kalanja*

Ceylon oak : *kosmr, lakshavruksha, kshudramra, dhanaskanda, krumitharu.*

Sweet fennel : *misreya, madhurika, misi, saleya,*

Barley : *yava, akshapatram, dhanraja, divyam, hayapriya, hayeshta, kunjukee, medhya. Pavitradhanya, sukta, swetsranga, seetasuka*

Tree of heaven : *arala, deerghavrunta, mahaniba, pootivruksha, khotakaranja*

Blacknight shade : *kakamachee, kakamata, kakakokali, kushghnee,bahuphala, bahutikta, sundaree, swadupaka.*

Jangli badam : *toovaraka, kushtavairi*

Velve leaf : *lakhupata, peeluphala, ambashtakee, varatikta, bruhatthikta*

Giant taro : *maananam, mahapatra, sphoolakanda*

Headache tree : *agni manda, arani, ganikarika, vaijayantra:*

Red sandalwood : *raktachandna, raktasara, kshudra chandana, harichandanam*

Cuscus grass : *usira, samagandhika, ranapriya, veeram, veeranam, sevyam*

Rosary nut : Rudraksha tree : *rudraksha, bhootanasana, neelakdaaksha, sivakahsa.*

Chinese date : *badaram, badari, badarika, phelila, koli*

Indian aconite : *valsanabha, visham, garalam, jangulam, halaahalam, theekshanam*

Sweet flag : *vacha, ugragandha, golomi, jadila, lomasa, shadgranthi, sataparvika, satapatri, mangalyam*

Cubebs plant : *sugandheephalam, kruthphalam kla, katukaphalam, choornaka, dviparicha, kankola, kankolaka.*

Drill : *satpushpa, satahva, madhura*

Garden rue : *gucchapatra, peetapushpa, satapadika, srpadamshtra, vishapaha, somalata*

Sal tree : *rala, salaja, salavruksha, dhrupavruksha, sarjarasa*

Sugar apple : *bahubeejaka, gandagatra, krishnabeeja, seetaphala*

Sunflower : *sooryavarcha, adityabhaktam, suvarchala, suryukhee.*

COMMONLY USED MEDICINAL PLANTS, THEIR ACTIVE PRINCIPLES AND USES.

Agasta : which is also known in Sanskrit as Agasti, agastidru is an important ayurvedic medicinal component which has large amount of tannin on the bark and blood red colored latex. It has vitamins minerals and other micronutrients. It is used for thridosha based ailments, fever, headache, injuries, etc.

Alangium known in Sanskrit as Ankola is an effective medicinal plant which has a number of Sanskrit names. It contains in its roots the alargin, markin and markidine alkaloids. It can be used for curing blood pressure based illness, hydrophoboea, fever and as anthelmentic etc.

Ackonite, which in Sanskrit known as athivishta, srungikam, etc has large quantity of carbohydrate, protein, glycerides, tannic acid, hestidine, heterophillicin, heterophillin, aconitin, etc. in the form of alkaloids. The plant parts are used for digestive abnormalities, fever, poisons, gland swellings, etc.

Tinospora known in Sanskrit as Guloochi or amruthavalli has berberin as one of the most important alkaloids in it. This plant has also got a component which is highly bitter in nature. The essence of the stem is used in many ayurvedic medicines. It is proved that the medicinal component present in the plant can control body temperature, purify the blood, improves the digestion power, it cures the skin diseases and diabetics. It is known to cleanse the kidney.

Asoka tree is known in Sanskrit as Asoka, hemapushpa, etc. It has high content of tannin in the bark. Catechol is another important constituent of the bark. It contains both essential oils and small amount of fixed oils in it. The imortant glycosides present in asoka tree bark are haemotoxylin and

ketosterol. It also contains large amount of saponin and calcium steroids The medicinal constituents of the bark are useful against poisons, and it reduces blood flow. It is bacteriocidal, and fastens the curation of wounds and reduces the stomach ache.

Malabar nut also known as Adathoda, has many names in Sanskrit. It is known as vasa vasaka: etc., Highly volatile oils are present in leaf, flower, root and seeds. The leaf contains vasisine alkaloid. The surface bark of the root has high quantity of the alkaloids. The drug is very effective against capillary bleeding. It improves the count of blood platellites.

Neem is a well known medicinal plant effectively used for many abnormalities in the body. It has many names in Sanskrit, nimba: arishta: thiktaka:, etc., are few among these names. It has margosin alkaloids in leaves and bark. The seeds contain margosopicrin, and large amount of fixed oil and glycosides. Nimbin, nimbinin, nimbidin, nimbostyrole, etc., are present in the seed oil. The flower has highly useful essential oil. The plant is very effective for the purification of blood, as a remedy for skin diseases, as anthelmentics, etc.

The century fig, known in Sanskrit as udumbara is a tree which contains tannins, saponins, wax etc. The active principles of the plant is known to purify the blood, effective for the urinary abnormalities, skin diseases, etc.

Castor plant which in Sanskrit is known as eranda, panchangula, vathari, etc., contains more than 50% of the seed weight the castor oil. This oil is the richest source of recinoliec acid. It also contains resins. This resin is highly poisonous glycoprotein, which is soluble in water. The Castor oil is a very inportant laxative.

Ginger, known in Sanskrit as sundi, nagara: etc., is an important constituent of ayurvedic preparations. High quantity of volatile oil and gingerol are the important constituent. It is said that there is no kashaya without ginger. It activates the digestive systems and is effective for fever and other ailments. In modern medicine also the giner is used.

Gingelly which in Sanskrit known as thila : is an important constituent in many after death ceremonies, may be due to the fact that, the Upanishad describe sesame/gingely and connect the body with black cover of the seed and the oil as atma present inside. Other than high quantity protein, oil and carbohydrate, the seed also contains sesamine, sesamolin. It effects our body in many ways. It fastens the cleaning of the intenstine, provides essential fatty acids, and protects skin when used for the oil bath.

Cardamom which in Sanskrit is known as ela and also in many other names. It contains both fixed oil and also essential oil. Cardamom is used in modern medicines also. Digestive action, kidney cleaning, maintaining

body temperature, etc., are said to be the beneficial action of the cardamom.

Prickly chaff flower known in Sanskrit as apaamarga: or mayoora contains the hentriya contane, saponins, oleonolic acid, etc. It is effective for urinary problems, reducing the deleterious effects of materials in body.

Terminalia chebula is perhaps the most important ayurvedic drug, known in Sanskrit as hareetakee, abhaya etc. It contains chebulinic acid, large quantity of tannins, etc. It has variety of medicinal properties. Digestive systems, procreative tissues, general tissues, etc are beneficially affected by the chebula.

Strobilanthus known in Sanskrit as sahachara is used for external and internal body application in Ayurveda. It contains high amount of potassium in leaves and an unusal alkaloid known as lupieol in the root. This drug is used for preparing ayurvedic formulation for the purification of blood, improving the sexual life and many types of skin disorers.

Monochoria known in Sanskrit as neelolpalam, is used for drug preparations. All parts of the plants are effectively useful. It improves the health, cures the burns and maintains the body temperature and useful for the fever.

Five leaved chest tree is known in Sanskrit as nirgundi, sinduvara: Meelamanjari, etc. It has large volume of volatile oils, resins, aromatic compounds, carbonic acids, variety of alkaloids, etc. The most effective components are tritia contane, N-hentria contane, N-pentantria, B sitosterols, hydroxy benzoic acid etc have received attention from researchers.

Bermooda grass even though wrongly named like this is a very important grassy plant used in medicinal preparation known in Sanskrit as durva, rooha, etc. It contains small amount of volatile oil, high content of minerals, and used for urinary problems, purification of blood, etc.

Trichosanthus is known in Sanskrit as patola, koolaka, etc It contains saponins, hentria containe, and fixed oil and little volatile also in the seed. It activates the digestive power, reduces the skin diseases, and other types of infections internally and externally.

Black oil tree, known in Sanskrit as jyothishmati, thejovati etc has oleum nigrum-a black coloured oil and also an yellow coloured oil in the seeds. The most important alkaloids present in the oil is said to be the cryojote.

Phylanthus deblis is known in Sanskrit as Bhoodhatri, bhoomyamalaki etc, which has highly poisonous material in the leaves. This component is effective towards jaundice. stomach ache, digestion, for preventing bleeding, etc.

Indian pennivert is a plant known in Sanskrit as mandookee, bhramee, etc., in contains amino acids, apartic acids, glycine, glutamic acid, phenyl alanine, etc. It is effective for improving memory and for rejuvenation. The bromides present in the plant extract is a good sedative. It is used for mental disorders also.

Black pepper, known in Sanskrit as mareecha valleeja, etc., has piperine alkaloids in the seed and skin. It also contains chavisin, piperidine, essential oils, resins, etc. and used against fever, cough, cold, and many digestive problems.

The sida plant known in Sanskrit as bala, vatyaala, etc., contains high amount of alkaloids, steroids, effidrinoid, etc. It is effective against paralyses, sexual disorders, as a pain killer and also against fever and cold.

Bel tree, is known in Sanskrit as bilwa, maloora:, etc. It contains emparatoriam A and B which are effective anthelmentics. Riboflavin, pepsin, tannins are other compounds present in bilva seed /fruit. It is a very effective medicine as raw and also after ripening. It contains marmin and marmalosin which are medicinal components. The oil contains egilin and egilanin which are alkaloids.

Indian dellium known in Sanskrit as guggulu, has myrcene, dimercyne, polymyrcene, etc as a part of the aromatic compounds present in the volatile oil. It is effective as a pain killer and for blood abnormalities. Used as a smoking agent and bacteriocidal component.

Clove has many names in Sanskrit, like lava, vara, devapushpa, etc. It has many role in the preparation of ayurvedic drugs. It contains more than 19% essential volatile oil. The oil is also present in leaves. Eugenol, caryophyllene and their isomers. It is used both in ayurveda and modern medicines, for improving digestion, against many diseases, as antiseptic, lungs disorders and as pain killers.

Bone setter, is an important medicinal plant which in Sanskrit is known as vajravalli, kulisa etc. It contains calcium oxalate, ascorbic acid, carotene, and the usual components present in other plants. It is known as bone setter and very effective in bone abnormalities.

Sandal wood, is a very expensive woody drug known in Sanskrit as swethachandanam, chandanam, etc. It has volatile highly viscous oil containing santalene, santalol and santalal, which are effective medicines. It is an energizer for the body and used for aroma therapy also. It is effective for urinary infections and blockages.

Fire plant known in Sanskrit as chitra and ooshnam. It has plumbagin alkaloid in its roots and hence the root is very effective drug for internal and skin based abnormalities mainly stomach problems in children.

Green gram is known from the vedic period as mudgam. It is a part of the Indian food It is contains albuminoids. It effective for cleaning the intenstine, imporving the digestive capacity, reducing fever and cold.

Erva lanta is the medicinal plant known in Sanskrit as bhadrika used effectively for removing the kidney stones by dissolving them out.

Nutmeg is known in Sanskrit as jati has lot of essential oil in the seed. It contains myristin, myristidin, myristic acid, etc. The volatile oil contains myristicol. All the these components together make the nutmeg and effective drug for improving digestion, curing stomach based illness, improving sexual capability, etc.

Boyerhavia diffusa is known in Sanskrit as punarnava, and punarbhava, and contains punarnavin alkaloid used mainly for urinary problems. The punarnavasavam is an important ayurveda drug.

Downly christia is known in Sanskrit as dhatakee. It has tannin in large quantity and variety of other components. Highly active as bacteriocidal and digestive enhancer.

Lotus known in Sanskrit as saraseeruham, is an effective drug to enhance or retard the actual qualities of other drug components. All the parts of lotus are useful as drugs. The most important active principle present in lotus rhizome is the nilemben. It regulates the blood flow, controls blood related problems. It is also used as an antiseptic.

Long pepper known in Sanskrit as pippalli, has pipyartin, piperin, as alkaloids and has large volume of volatile oil. From the stem the seroids are obtained. The important steroid are dihydro stigmasterine and serioid.

Holy basil is known as tulasi has large amount of volatile oil and used against fever, heart problems and lungs problems. It is used as antiseptic. Very effective for skin diseases also.

Ixora coccinia known in Sanskrit as raktala has tannin, fixed oil, acidic components, etc. The plant is useful for stomach ache and other stomach problems. It is effective as antimicrobial.

Touch me not is known in Sanskrit Lajjalu and raktapad is effective for pulmonary problems, thirst based symptoms, and as anti bacterial.

Cowhage known in Sanskrit as ajada, kandoora has variety of minerals in it and dihydroxy phenyl alanine, glutathion, lecithin, gallic acid, variety of glucosides, etc. It is excellent for rejuvenation and improving blood circulation.

Country chiratta is known as bhoonimba and thiktaka having little oil and bitter principles, The kalmegnin alkaloid is present at very high level in this

plant. Used for the lever problems in the children, improving the performance of digestive glands and purification of blood.

Indigo plant is known in Sanskrit as nila, thuttha, etc which has indgotin upto 50% and indigotin in Sanskrit is known as nadkarni. The drug is used as antiseptic, and also for parallitic abnormalities.

Indina gooseberry is known in Sanskrit as dhatree, amrutha, amalakee, etc. It contains pectin, vitamin C, high level of iron, tannic acid, resin, sugar, albumin etc., It is used in health tonics for purification of blood, eye ointments, bone abnormalities, creating healthy blood vessels, and for improving digestive power.

Indian trumpet flower tree, known in Sanskrit as syonaka, aralu has oroxylin crystals and bitter principles. It has pectin and different types of alkaloids. It is used against parallytic problems, and digestive problems.

Stereospermum chelonides, known in Sanskrit as patala, krishnavruntha etc., has lapacol which is an important antitumour component and used for edema. It is a pain killer, and used for digestive problems.

Ashclared fliben known in Sanskrit as sahadevi has beta amerin acetate, luppeol acetate, beta amerin lupeol, alpha spinasterol, and used for urinary problems and as antiseptic.

Bacopa monnieri known in Sanskrit as brahmi has brahminin, erpestin, alkaloids, this plant has highly effective use in heart based problems, affects positively the blood circulation and improves memory power.

Indian medder, known as manjishta, or vikasha has manjistin, garasin, alizarin, santhin glycosides in the roots. Hence used as brain and joint pain killer. It is used for the purification of blood, for diabetics, and has antiseptic property also.

Turmeric known in Sanskrit as haridra, gouri, rajani has rhizomin, turmeron curcumin, as alkaloids and essential oil components. It is an effective antispectic and colourant.

Coriander known in Sanskrit as dhanya, chatra, etc has both fixed and essential oils, in the seed and leaves. It also contains coriandrin and geraniol as the most important components. It improves digestive power, and acts as energizer.

Biophytum senstivium known as samanga and alambusha has very effective anti cough property and used as anti-inflamation agent.

Nut grass known in Sanskrit as mustaka, and varidam has variety of essential oil components and alkaloids. These components are effectively used for fever, cleaning intestine, improving digestive power and against urinary problems.

Emila sonchifolia is known in Sanskrit as sasasruti is effective against fever, stomach problems tonsellites, etc.

Drumstick known as sigru in Sanskrit has moringin, moringinin, alkaloids in the root and bark, It is an important anti inflammatory drug for external application and can be used as a good sweating agent and sedative.

Wawrung known in Sanskrit as vodanga had embellic acid, fixed oil, essential oils, tannin and an alkaloid known as elbellin. It is used as anthelmentic and as anti leprosy drug.

Garlic in Sanskrit known as lasunam or ugrasandha, has propyl disulphide and di allyl disulphide, which gives the characterstic properties of the garlic. It is used for many body abnormalities and as a part of ayurvedic drug formulations.

Asparagus racemousus, known in Sanskrit as satavaree has aspargin alkaloid. The plant is used for variety of illness, like sexual problems, blood diseases, high temperatire, etc.

Withania root known in Sanskrit as aswagandha and also in many synonyms, has variety of alkaloids in the leaves known as withanolides This is a starting material for the withaferin used an antimicrobials. Thirteen types of alkaloids have been isolated from the roots. Anahygrine, meso anaferine, cusco hygrine, isopelleterine, hygrine, tropine, pseudotropine, choline, withasomnine, somniferine, etc are the important among the lakaloids. It is used as a sedative, energises the activity of heart, brain and blood cirulation systems. It cures head ache, skin abnormalties, etc. interestingly all the parts of this plant has medicinal properties.

Bishops weed in Sanskrit is known as agni, ajamodaka and so on. It has measurable amount of volatiles and the compound apiin is extracted from the oil, which is a glycoside. The seeds are highly antiseptic in nature. It is used for solving the problems connected with digestive systems, and directly influences the heart beat, reduces pain in body.

Licorice known in Sanskrit as yastimadhu and athirasa. It has high quantity glycerine, ramnoglycoside, licuiritigin, licuiritin, isolicuritigenin, which are all the glycosides. The drug has most effective use in the throat cleaning, intestine cleaning, and effective for the lungs functioning, heart beat, stomach based problems, vomiting, etc it is also used for abnormalities in the eyes.

Fenugreek known in Sanskrit as methika. It has trigonelline and choline, as alkaloids. It has aromatic compounds like quercetin and inteolin which are glycosides. It is excellent for the arthritis, and a stimulant for endocrine and digestive systems. It has a variety of other ayurvedic properties also.

Asafoeitida which in Sanskrit is known as hingu, ramata, etc., contains less than 3% volatile oil. It contains camphene, epinine, etc. The asafoetida is a good digestant, enhances memory. It is excellent as stomach active agent and digestant.

Chiretta plant, known in Sanskrit as kiratikta, haima, etc has chiratin, ophelic acid and margiferin, jentianin as alkaloids. The plant is effective for fever, malaria and related diseases.

Costus, known in Sanskrit as kushtam, pushkara, etc., has a powerful oil which has a glycoside known as sossurine alkaloid. It also has tannin. Cures the lungs and digestive- abnormalities. It is effective for cough, allergy, skin disorders, etc.

Gymnema sylvestre is known is Sanskrit as ajasrungee, madhulikaa, etc. It has noncosane, hentriyacontane, triaconatene and gymnemic acid. It also has anthraquinone and ideal for diabetics, diuretic, regulates heart activities, and excellent remedy for snake bite.

Indian senna, known in Sanskrit as sonamukhi has sennoside A and B mannitol, salicylic acid, chrysophanic acid saponins, etc. It is a very good purgative. It reduces skin disorders, and act as anthelmentics.

Cumin in Sanskrit known as jeeraka, ajajee, etc has volatile oil containing aldehydes, cymine, etc. This is an excellent digestive stimulant, anti-vomiting agent, cures and eye infections.

Himalayan silver fur known in Sanskrit as thaleesapatra and thaleesam has siyadopithicin as an important constituent in the leaves. It reduces cough and lungs based abnormalities.

Himalayan cedar known in Sanskrit as devadaru, suradaru, etc. It contains an oleoresin in the trunk. It has turpentine and cholestyrin.

THE SCIENCE OF SELECTION AND PREPARATION OF RAW DRUGS IN AYURVEDA

Unlike any other medical system, the Ayurveda has many specialities, which once upon a time was thought as superstition. However when the modern phytochemical information and knowledge are getting piled up from a series of studies and systematic research, many of the indications and guidance given in the collection and processing of the raw drugs, in the ayurvedic texts, can be easily proved as scientific. They can be easily analysed based on the upto date knowledge on phytochemistry. Many of the guidance lines given in the literature can be justified as the requirement of the probable and possible chemical modification for the final drug formulations. Here an attempt is made to analyze those indications given in the ancient ayurvedic texts.

COLLECTION OF THE RAW DRUGS

Many paramenters are monitored while collecting, raw drugs for the ayurvedic preparations. Those guidance may directly be based most probably on the first hand experience of those scientists. In the Charaka samhita, the most authentic book on Ayurveda written in Sanskrit, it is mentioned that

Saakshaath anubhavair drushto na strutho na guru darsitha, lokaanaam upakaraaya ethath sarvam pradarsitham.

The message of the above lines : All the parameters for the collection of the raw drugs, what ever is mentioned in the ancient texts might have been arrived at through the experience of the ancient scientists. Not presented merely from the teachers or not presented as though it is told by someone. They are described for the benefit of the common people. From these lines it is clear that the directions are given based on their own experience and experiments.

There are variety of plant tissues used as raw drugs. They are roots, rhizomes, stems, barks, leaves, buds, flowers, raw fruits, ripened fruits, seeds, seed coats, etc. In some cases the latex or exudates are also used as raw drugs.

Instructions are given to monitor the maturity while collecting the drugs for the formulation preparation. The other parameters include the thickness, the age, possible content of the skin/carp, the direction of the growth of the root, the soil in which the plant is growing, etc. Similarly direction given for the collections of the barks is so clear that the maturity of the bark, the age of the tree, the dead cells present on the epicarp of the stem, the variety of the plant from which the barks are collected possible pith content in the bark, etc.

Instructions are given to select reasonably matured plants only for the stems unless otherwise specified. It should not have too much dead cells in the form of pith. It should be not too tender because the medicinal constituent or their precursors may not present upto the expected level.

Maturity of the leaves are clearly specified for getting the optimum quality expected for the final formulation. Maturity of the leaves, through the formation stage-deep green stage-yellowing stage-senescence stage-falling stage-dried leaves are the general choice for collection. All these types have their own advantages and disadvantages and depending upon the requirement, one has to select the leaves.

Buds of many plants are used in ayurvedic preparations. When compared to other parts of the plants, the buds used for the drugs preparations are less in number. However the quality of buds depends upon the maturity,

size, the day of their formation and the number of days for blooming to flower, etc. Hence care should be taken for procuring the same.

The fruits are selected based on their maturity where the required maturity is specified. Very tender fruits will have an entirely different composition compared to the matured fruits. Even in the last stage of maturity of the fruits, the chemistry will be remarkably different. Hence while collecting the fruits of the plants, specification is essential. In many cases the fruits and seeds remain one and the same as the maturity wise. Here the fruit maturity has a direct bearing on the active principles of the seeds too.

It goes without telling that the plant seeds play very crucial role in many of the drugs / formulations. Sometimes the seeds may be the source of oil, protein, starch and in majority of the cases they may be the source of active principles. Almost all the studies carried out connected with the seeds, at different stages of their maturity, the active principles are proved varying significantly in them. Hence collection should have a firm bearing on the maturity of the drugs. However, if the requirement of the active principles are less for the final formulations, it can also be so monitored by using the less mature seeds.

As we have discussed variety of parameters which should be carefully monitored for the presence of required level active principles in them. Suggestions have also been given for the collection of the raw drugs based on the seasons. The climatic conditions do have direct bearing on the active principles of the roots, stems, leaves and flowers. Another important parameter is the time of collection of the plant tissue. For some of the buds and flowers which stay only for a day or two, the time of collection is very crucial. In some cases collection at the morning and at the evening make a lot of difference compared to the collection at noon or midnight. Yet another important parameter to be looked into while collecting the raw drugs is the infections/breakage/decay/spoilage etc., due to many reasons. Major reasons are the birds, pests, microbes, yeast, etc., These infections in the drugs can cause significant changes in the chemistry of the drug components. Hence all these parameters mentioned in the ayurvedic texts are to be looked into while collecting the drugs, wherever possible.

PLANT TISSUES USED FOR DRUGS

Roots or rhizomes : vetiver roots, kushta, priyanga, ambu, nalada, kopana, nata, rasa, aswagandha, turmeric, wild yam, bala, mustha, ginger, hrivera.

Wood and bark : surahwa, manjishta, loha, hima, devadara, yashitamadhu, Krishna agaru

Leaves : Tulsi, lotus, jasmine, tamarined leaves.

Buds : clove, buds or banyan tree, areca nut buds.

Flowers : coconut flowers, lotus

Fruits and seeds : Misis, red pepper, pippalli, cordiander, dill, cumin, fenugreek, cardamom.

Juice : Sanninayaka,

Latex : Tunshka, nalika, sajarasa, asafoetida

Grass / plant as such : sprik, lemon grass, ginger grass, nakha, sahachara,

General observations on the quality of the above raw drugs and their collection period.

- Tender roots will have minimum pith in it and the active principles will also be minimum in the root and bark, which generally are the carrier of the active principles.
- Immature plant tissues contain high amount of water and hence the active principles will be low and they will only be in the formation stage.
- Collection of tender roots will also be difficult as they are soft in nature and can break during the collection.
- Volatile oil content, alkaloids, etc will be practically absent in the roots when they are too tender.
- In the case of stem too the content of the active principles will be the highest when they are fully matured.
- The stem of the main trunk, branches and branchlets will also vary significantly due to different stages of their formation/maturity. Hence wherever optimum quality parameters are described corresponding maturity level has to be maintaned for the stem, particularly when the bark of the stem is utilized.
- In many drugs the bark is selected as in the case of cinnamon. For such types of raw drugs the bark should have sufficient maturity, thickness and minimum surface dead cells, for the proper chemical composition.
- Whenever the hard wood is utilized for the preparation of the drug, enough active principles can be expected only when the maturity is attained. Hence focus on the collection of stem should be given to see whether the stem is of primary/secondary or tertiary wood parts.
- Special types of stems like that of lotus, tinospora, etc., the maturity may not be as crucial as in other cases, like a banyan tree.
- It is well known that the cedar wood and sandal wood are not suffciently mature, they will not have any medicinal properties.
- Leaves are avaialble at different maturity, even though general stay period of the leaf can range between 20 to 60 days. Their volatile oil, carotenes, tocopherol, fiber content etc will be very low in the initial stages. Hence, depending upon the requirement of the active principles

the leaves of required maturity is to be collected. In the case of clove leaves the qualitative and quantitative composition of mature leaves and tender leaves are significantly different. This will fetch a different effect altogether when used in the medicines. However the leaves of lotus, tulsi, cinnamon etc., may have the same composition at all maturity level.

- Buds and flowers may not have the required level of essential oil, polyhenols, aromatic components, alkaloids and other phytochemicals if they have not attained the required level of maturity.
- They are to be plucked in specific time of the day and season to maintain the quality of thier active principles.
- Fruits will have entirely different composition when they are tender from that of the mature ones. This can obviously be seen in the case of pepper, cardamom, gooseberry and for that matter any types of fruits.
- In fruits, majority of the cases, the tender fruit composition will be entirely different from that of the mature fruits. Hence depending upon the suggestion given in the authentic texts, the maturity for the collection should be decided. Due to the paucity of the raw drugs, generally adulterant & substituents etc., of the immature fruits are used for the drugs.
- Whatever guidances are mentioned above, for the fruits, the same are applicable for the seeds also. Particularly the seeds like castor, cardamom, gingly and variety of cereals, spices, etc., used in ayurvedic preparations, the maturiy is very crucial.
- Other than the above general statements, there can be specific cases also, which should be analyzed with the true spirit of modern science.

  The seasons for the collections of the plant tissues and places of collection are also specifically guided. It has been proved by the modern methods that the variety of the plant grown at different locations do have different composition of the active principles. The plant grown in Himalayas, Vindyas and those grown in a raw field may vary significantly.
- The composition of the tissues when collected during rainy season will be vary from that of the winter or summer season. This shows that the season of collection has a direct bearing on the content of phytochemicals of the tissue.
- Thus the chemistry of collection of the raw drugs and the suggestions/ directions/guidance given by the rishies agree.

DRYING AND STORING THE RAW DRUGS

Generally the drugs collected from their sources are dried or stored before

they are used for the preparation of the final products. Other than this, different types of changes can take place in the cells.

Three major types of drying procedures are adopted. The first and the most important procedure particularly connected with tender tissues of the plants like, leaves, buds and flowers are shade drying, where direct sun light is not allowed to fall on the product.

The advantages of the shade drying and the chemistry:

- By this method the loss of volatiles will be minimum and the drug efficiency will be higher compared to other methods of drying. This is due to the fact that the temperature of the tissue is maintained at low level. When heating rate increases the moisture evaporates rapidly resulting in the breakage of the cells and escape of the volatiles with the water vapour.
- Shade drying prevents or reduces the changes of oxidative degradation of the drug components. For oxidative changes sunlight can act as a crucial parameter. The uv light, intense heat and also the free flow of air (wind) activates the oxidative changes in the components present particularly on the surface cells of the raw drugs.
- It prevents the bleaching of the tissues. It is well known that sunlight can bleach the colour particularly chlorophyll, carotene, polyphenols, etc. Even it can affect many micronutrient properties of the above and also the toccopherols. Thus protection of these micro nutrients can be effectively possible when the raw drugs are dried under the shade as specified in the ayurvedic texts.
- The in vitro enzymatic changes taking place during the drying process will be minimum when the moisture of the seed is removed slowly. The enzymatic activity takes place at the peak level when the temperature is at about 40 degree. If drying is done at a lower temperature, the possibility of enzymatic changes can be reduced significantly.
- Quality of the drugs can be maintained without further lowering even if the raw drugs is of the lower grade, when this method is adopted. Many substitutes/lower grade plant products like immature tissues, fallen leaves-fruits and seeds, infected plant parts, etc., undergo faster deterioration at higher temperature of drying.

The disadvantages of shade drying: The shade drying takes, more time, space, manpower for attaining a lower level of moisture contents in the drying process.

It also affects the quality of certain raw drugs in a different way. The moisture removal takes place slowly. Hence the storage time increases. During

this period the chemical/enzymatic changes are possible in the stored tissues, particularly if the drug is tender bark, fruit or leaf. Higher rate of growth of microorganisms like fungus, microbes, virus, etc at higher moisture level for a long period is possible. Hence quick or direct sun drying or artificial drying is advocated for that type of drugs.

Depending upon the seasonal variations, the time taken for the shade drying may vary significantly. Hence during rainy season, faster drying either in the available direct sun light or using artifical devises is suggested.

Advantages and disadvantage of direct sun drying : It needs lesser time, manpower, storage space and economical paramenters. It can also maintain the quality of the drugs. But where the possibility of the loss of volatiles, bleaching of the fine components, etc are not expected there this method has disadvantage. However fermentation in fruity drugs like grapes, lemon, gooseberry, etc., is higher. Here maintaining lower temperature for drying is best. The quality of pepper, cardamon, cinnamon etc appeares to be very high when dried in the shade. Drying in the shade is of great importance for all spices, when the humidity in the atmosphere is low (like north Indian states). However care may be taken for adopting suitable methods of drying where humidity is high.

Advantages and disadvantages of direct or indirect heat drying: It is to be remembered that in olden days, heat drying was possible only by placing raw drugs above the fire wood, or on the surface where heat is available from the fire or directly heated on the heated vessel. Under all these conditions controlling the temperature is done arbitrarily. Hence, the possible chemical changes can also be predicted, when the temperature varies without control.

The advantage of the rapid heating for drying method is that, enzymatic in vitro changes can be arrested, the microbial infection and quality deterioration can be prevented. For prolonged storages this method gives better results as the moisture level can be definitely fixed at a known level below 6%. Space, time, manpower etc can be reduced, so it is economically beneficial too. This method may be opted provided other major quality parameters of the drugs are not affected, like loss of volatiles, colour, sudden heat based changes etc. In the modern systems controlled heating equipments are available and they have many well known results and merits.

STORAGE OF THE RAW DRUGS AND THE CHEMISTRY OF STORAGE

In olden days of Ayurveda, raw drugs are available in plenty and commercial production of the formulated drugs was not undertaken at the present level. Hence the storage problems were absent when compared to the present state of art.

Just like the collection paramenters influence the drugs quality, the storage parameters also influence the quality of the drugs. An excellent clean spacious storage house frequent removal of the deteriorated plant tissues, cleaning and removing the pests, avoiding the mixing of good quality drugs with decaying drugs, keeping different types of raw drugs in different spaces, controlled fumigation to get rid of microbial contaminations (important for the storehouses of fruits and sugar rich seeds) are advocated.

It can also fetch good result provided, the drugs are water washed (wherever possible) and dried prior to storage, so that the microganism which might have crept into the drugs can be removed before storing. The microganisms, pests, worms, etc can become a permanent disturbance if not taken care of before taking the drugs into the store houses.

Sufficient ventilation, frequent examination of the stored drugs, removal of olden stocks, surrounding hygiene, etc are to be monitored for keeping the quality of the raw drugs in the optimum level.

CHEMISTRY AND THE METHOD OF USING THE DRUGS.

The common forms of ayurvedic drugs are choornams, kashayams/ decoctions, paste with boiled jaggery lehyam, fermented products/ arishtas, aasavas, guikas/pills or tablets, thylam or oil extractions, ghruthas/ghee products, etc. According to experts each system has its merits. There are very clear, systematic, reproducible, processes for the preparation of these formulations. The proportion of the drugs, the level of grinding, time for the processing of the drugs, heating level, storing, etc. are also clearly mentioned for each drug. Even for the same class of drug formulations the processing parameters may vary significantly. A systematic analyses of the final product can give wonderful information, on the parameters selected for the drug preparation.

CHEMISTRY OF *CHOORNAS*

Generally raw drugs are finely powdered and mixed with sugar, salt or appropriate materials as advocated in the authentic texts for making the choornas. All the heat based or water based processing steps are avoided in the choornams. It is a way of directly consuming (eating) the raw drug in the powder form. Here the drug particles as such get digested and the active principles are absorbed. In certain cases the choornams are boiled with water, or mixed with ghee/ honey or milk before taking.

Since heat based processing is avoided in choornams the microorganisms if present will remain as such. Hence the raw drug should be made free from all types of microorganism or deleterious

materials/components. Deleterious plant parts should not be present in the products, if the final product is meant for internal use. The choornams are very effective remedies for many health problems due to the fact that the active principles are absorbed in the body without any pyrrolitic/ hydrolytic changes. Some of the choornams are directly applied on the skin also. Here the active principles are slowly absorbed through the skin.

Given below are the names of a few commonly used important choornams:

1. *Yavaanyaadi choornam*
2. *Thaleesa patraadi choornam*
3. *Magadajaati choornam*
4. *Kaarpaasaasthyaadi choornam*
5. *Elaadi choornam*
6. *Jaateelavangaadi choornam*
7. *Katukaadi choornam*
8. *Karpooraadi choornam*
9. *Ashtachoornam*
10. *Thukaadi choornam*
11. *Gulasundi choornam*
12. *Thekakarajarasa choornam*
13. *Jeevanthyaadi choornam*
14. *Trikatuthriphalaadi choornam*
15. *Sarasijamakarandaadi choornam*
16. *Amruthaapippalyaadi choornam*
17. *Pushyaanugam choornam*
18. *Hutabrungaadi choornam*
19. *Sooranaadi choornam*
20. *Raja choornam*
21. *Kaankaayanamodakam choornam*
22. *Kayampurandaradi choornam*
23. *Vahnivajram choornam*
24. *Kushmaandorvarubeejaadi choornam*
25. *Akulee choornam*
26. *Vilangaraasnaadi choornam*
27. *Thrilavanapasuganadhaadi choornam*

28. *Hinkuvachaadi choornam*
29. *Hinkutawagaadi choornam*
30. *Mahavruksha lavana choornam*
31. *Ayorajonaagaraadi choornam*
32. *Naarachaka choornam*
33. *Pippalyadi choornam*
34. *Mandooravatakadi choornam*
35. *Kalyaana kshaara choornam*
36. *Vilangaadi choornam*
37. *Vishalaadi choornam*
38. *Navaayasam choornam*
39. *Naagaraadi choornam*
40. *Shardoola choornam*
41. *Vaiswanara choornam*
42. *Hapushaadi choornam*
43. *Varaahyaadi choornam*
44. *Pittaprasamana choornam*
45. *Krishnaadi choornam*
46. *Indrasani choornam*
47. *Ayaskaantaadi choornam*
48. *Gugulvaadi choornam*
49. *Yogaraja choornam*
50. *Saaraswata choornam*
51. *Naasikaachoornam*
52. *Avipathy choornam*
53. *Maashaaswagandhaadi choornam*
54. *Huthaasana choornam*
55. *Raasnaadi choornam*
56. *Kachooraadi choornam*
57. *Aswagandhaadi choornam*
58. *Kapithaashtaka choornam*
59. *Agnimukha choornam*
60. *Daadimaashtakam choornam*

THE CHEMISTRY OF KASHAAYA

The kashaayas are the most important class of ayurvedic preparations. In many cases they are the final formulation. In some cases kashaayas are intermediate for the preparation of arishta, asava, rasayana, thyla and so on. Under all these conditions the aim of preparing the kashaaya/ decoction is to extract very systematically the active principles from the raw drugs. While preparing the kashaayas, a series of chemical changes known and unknown will be taking place in the extracts. There is a wrong understanding that kashaaya preparation is merely extraction of the active principles present in one or more components of the raw drugs directly. This wrong understanding has also lead to the direct use of plant extracts for the preparation of the final formulation. The kashaaya is a decoction prepared by adopting a series of processing parameters / unit operations.

The quantity of the raw drug components for kashayas is specifically described in various ways. Either as proportions, weights, lengths, volumes or arbitrarily selected amounts. Unless otherwise standardized, the use of a substitutes or extracts may not be as effective as the product obtained by adopting the method described in the ancient ayurvedic text books .

In the traditional method, the temperature of processing (heating or warming)used to be controlled using the specific fuels or sand bath. This method indicates the temperature control for extraction, concentration, drying, roasting, etc. In some cases the duration of heat processing has also been specified directly or by way of reduction in the volume of the solution

Sometimes other additives are also mixed for improving the curative efficacy of the ayurvedic drugs . Some of the ayurvedic kashayaas are for purgation, vomiting, or sweating, etc and hence may not have direct curative effects.

Chemical changes during the preparation of kashaayas.

The raw drug components when heated with water two types of changes are taking places hydrolytic and pyrolitic changes. The hydrolytic changes include the conversion of esters into alcohols and acids, rearrangement in the chemical structure of the components, better dispersion in the water, removal of the volatile components with steam, imbibitions of the starchy materials, decomposition of the proteins into peptides, isomerization and structural changes in the active principles like carotenes, chlorophylls, vitamins, etc.

In kashaaya preparation, tracing the chemical changes of even the major components during heating is a complicated problem. A kashaaya is a multi drug- multi component system. Hence changes can be multi-facial. Each chemical change is directly influenced by temperature/ duration of heating /presence of additives/other components/ water/alkaline & acidic materials etc. Isomerization, decomposition, polymerization, etc can also take place depending upon the nature of heating.

In majority of the kashaaya preparations, the particle size of raw drug components has been specified indirectly using the words crushed / powdered / pressed / etc. They may be used as powder, crushed products, heated and powdered materials/ preextracted solutions, etc. Addition of components, duration of heating, etc., are also to be specific. Given below are the important kashaayas described in the sahasra yogam.

1. *Mahoushadaadi kashaaya*
2. *Duraalabhaadi kashaaya*
3. *Dusparsakaadi kashaaya*
4. *Chirivilwaadi kashaaya*
5. *Chandanaadi kashaaya*
6. *Kulathati kashaaya*
7. *Devadaarvaadi kashaaya*
8. *Mustaakaranjaadi kashaaya*
9. *Charngaryaadi kashaaya*
10. *Chsaananthaadi*
11. *Dhaanyaadikashaaya*
12. *Pathyaadi kashaaya*
13. *Poothikaadi kashaaya*
14. *Dhaanyaadi kashaaya*
15. *Dasamoolaadi kashaaya*
16. *Vyaagryaadikashaaya*
17. *Bruhatyaadi kashaaya*
18. *Hareetakyaadi kashaaya*
19. *Aakulyaadikashaaya*
20. *Kathakaghadiraadi kashaaya*
21. *Nisaakatakaadi kashaaya*
22. *Vidangaadi kashaaya*
23. *Vyaghryaadi kashaaya*

24. *Varanaadi kashaaya*
25. *Nimbaadikashaaya*
26. *Mustachandanaadi kashaaya*
27. *Lasunaadi kashaaya*
28. *Nasoonairandadi kashaaya*
29. *Raasnaadi kashaaya*
30. *Saptasaram kashaaya*
31. *Kanaasathaahwaadikashaaya*
32. *Chitrakaadi kashaaya*
33. *Mulailaadi kashaaya*
34. *Nirgundyaadi kashaaya*
35. *Satavaryaadi kashaaya*
36. *Pathyaadi kashaaya*
37. *Erndadi kashaaya*
38. *Dasamoola panchakolaadi kashaaya*
39. *Nikumbaadi kashaaya*
40. *Punarnvaadi kashaayaa*
41. *Paasaadi kashaaya*
42. *Vyoshaadi kashaaya*
43. *Dvipanchamoolaadi kashaaya*
44. *Vaasaaguloochyaadi kashaaya*
45. *Nitambatwagaadi kashaaya*
46. *Gokshooraadi kashaaya*
47. *Patolaadi kashaaya*
48. *Kalakaadikashaaya*
49. *Jeevanthyaadi kashaaya*
50. *Sundeevalaadi kashaaya*
51. *Draakshaadi kashaaya*
52. *Chandraparpatakaadi kashaaya*
53. *Dvipanchamoolaadi kashaaya*
54. *Drakshaadi kashaaya*
55. *Khadeeraadi kashaaya*
56. *Kakotumbareekaadi kshaaya*
57. *Guloochyaadikashaaya*
58. *Sundyaadi kashaaya*

59. *Nirgundyaadi kashaaya*
60. *Vidangaadi kashaaya*
61. *Mustaadi kashaaya* ,
62. *Daadimaadikashaaya*
63. *Ashtavargam kashaaya*
64. *Dhanadanayanadi kashaaya*
65. *Prasaarinyaadi kashaaya*
66. *Rasonadi kashaaya*
67. *Sahacharaadi kashaaya*
68. *Gandharva hastaadi kashaaya*
69. *Maharaasnaadi kashaaya*
70. *Mahabalaadi kashaaya*
71. *Shataavaryaadi kashaaya*
72. *Rasnaerandaadi kashaaya*
73. *Vasaadi kashaaya*
74. *Navakarshikam kashaaya*
75. *Kokilaakshaadi kashaaya*
76. *Laghumanjishtaadi kashaaya*
77. *Bruhanmanjishtaadi kashaaya*
78. *Varaasanadi kashaaya*
79. *Katukaamalakaadi kashaaya*
80. *Patolaadi kashaaya*

The quantitative and qualitative intake conditions are specifically described in the texts. Pathyas to be followed for getting the expected results are also mentioned in the text. The period of storage, reheating, preservation methods, etc are clearly directed for each kashaaya. In many cases, the composition of the kashaya and the nature of additives are prescribed keeping the age, sex, other ailments of the patients and their general health conditions. However, many of these parameters are not adopted or followed when large quantity of kashaya is formulated in huge containers using modern equipments and techniques. The modern methods of kashaya preparation have their own advantages and disadvantages.

THE CHEMISTRY OF THYLAM / THE OIL EXTRACTS

The thylam preparations are (generally) used for external applications. Some of them are also used for internal application. In thylams, the

medicinal principles of the raw drugs are directly or indirectly dissolved in the oils. These oils may be edible or non edible . Cleanliness/ purity of the drugs, good storage conditions, free from microbial and other contaminations are the pre-conditions satisfied in the preparation of the thylams. The quality of the oil/ghee is to be excellent, otherwise the peroxide formation, rancidity and hydrolytic degradation will result in the thylams.

There are two general methods for the preparation of the thylams either by directly heating the oil with the raw drugs after proper grinding or extracting the active principles of the drug with water or milk and then from that, the thylam is prepared. In the first method the active principles of the drug get dissolved in the oil and it is absorbed either externally or internally depending upon its application. In the second method, all the required heat and hydrolytic changes will be taking place when the raw drugs are extracted as kashaaya and from that concentrate, the active principles get dissolved into the oil.

Commonly used thylams are the following:

1. *Dhaanwantharam thylam*
2. *Suddhabala thylam*
3. *Ksheerabala thylam*
4. *Chirabhanjanavimardhana thylam*
5. *Pinjaadi thylam*
6. *Kethakyaaadi thylam*
7. *Parinathakeraksheeraadi thylam*
8. *Devadaarubalaadi thylam*
9. *Balagulichyaadi thyalam*
10. *Kaarpaasaasthyaadi thylam*
11. *Kottamchukkadi thylam*
12. *Laakshaa thylam*
13. *Chandanaadi thylam*
14. *Aaranaalaadi thylam*
15. *Pindathylam*
16. *Mahalakshaadi thylam*
17. *Bhrungaalarkadi thylam*
18. *Thekarajaadi thylam*
19. *Panchavalkaadi thylam*
20. *Jeernapinyaakaadi thylam*

21. *Prasaraneethylam*
22. *Sahacharaadi thylam*
23. *Balaathylam*
24. *Dinesavalyaadi thylam*
25. *Naalpaamaraadi thylam*
26. *Kachoraadi thylam*
27. *Gulgulaadi thylam*
28. *Elaadi thylam*
29. *Nisoseeraadi thylam*
30. *Pullanyaadi thylam*
31. *Vilwampachotyaadi thylam*
32. *Karambhaadi thylam*
33. *Nonganaadi thylam*
34. *Vachadi thylam*
35. *Durddhuraadi thylam*
36. *Jeemoothaadi thylam*
37. *Neelabhrungaadi thylam*
38. *Neelanisaadi thylam*
39. *Vacholasoonyadi thylam*
40. *Nirghundirajanyaadi thylam*
41. *Thulaseeswarasaadi thylam*
42. *Thinthrineesarasaadi thylam*
43. *Thungadrumaadi thylam*
44. *Jaathyaadi thylam*
45. *Chandanaadi thylam*
46. *Maashaadi thylam*
47. *Kushtaanthakam thylam*
48. *Vajraka thylam*
49. *Mahavajra thylam*
50. *Thriphalaadi thylam*
51. *Asanavilwaadi thylam*
52. *Naagaraadi thylam*
53. *Manjishtadi thylam*
54. *Balahatadi thylam*
55. *Arimedaadi thylam*

56. *Punkhaadi thylam*
57. *Ramattadi thylm*
58. *Ajjadaadi thylam*
59. *Dinesa valyaadi thylam*
60. *Thilaadi thylam*
61. *Nagaraadi thylam*
62. *Anuthylam*
63. *Sahadevyaadi thylam*
64. *Vranaropana thylam*
65. *prasaarineethylam*

These are the thylams explained in the sahasra yogam

CHEMISTRY OF GHRUTHA PREPARATIONS

Almost all the ghrutham preparation methods follow the similar unit operations adopted for the production of the thylams. However gruthams are prepared using ghee and in some cases ghee and oil. As explained in the thyla yoga there can be two methods for the preparation of ghruthams. Mixing the raw drugs, after sufficient grinding and sieving, and then directly heating with the ghee for the specified time under the specific temperature for the proper extraction of the active principles is the first method. The second method is preparing the extract using water or milk by continuously boiling the solution for the required time as directed in the kashaaya yoga/ and then mixing the kashaya with ghee and concentrating the mixture till the ghee becomes almost free from the water / moisture. The ghrutham, generally will have the colour and to some extent the flavour of the component drugs.

As mentioned for the thyla yogas, all the parameters for keeping the quality of the final product are to be maintained for getting the best ghrutham products . Since the ghrutham products are (generally) for consumption, additional care should be taken for maintaining the quality of the raw drugs and also that of the ghee.

Ghrutha preparations are to be processed carefully because the ghee contains large amount of lower chain fatty acids compared to any oil preparations (thyla preparations). Presence of more water/moisture can cause obnoxious flavor for the product. The ghee does not have much antioxidant by itself. The plant oils do have toccopherols, carotenoids, etc for preservation as anti oxidants. Ghee is almost cent percent saturated fat where as the thyla preparations may contain high level of unsaturated fatty acids. The poly unsaturated fatty acid content in the

sesame oil is very high and it is the oil commonly used for the thyla preparation, and it contains sesamol, sesamine etc which act as antioxidant for the protection of the oil preparations.

Ghrutham, will have significant amount of cholesterol whereas the plant products contain only phytosterols. The ayurvedic physicians have definitely demarked the qualities of the thylas and ghrutha products which do have scientific standing. As far as the digestion chemistry (biochemistry of digestion) is concerned, since the ghee and butter have short chain fatty acids, the metabolic pathway of the degradation of these fatty acids are not as specified for the long chain fatty acids.

Common ghrutha preparations given in Sahasra yoga

1. *Sukumara ghrutham*
2. *Mahakooshmaanda ghrutham*
3. *Kalyaana ghrutham*
4. *Glguluthikthaka ghrutham*
5. *Amruthapraasa ghrutham*
6. *Aswadamshtraadi ghrtham*
7. *Madhukaadi ghrutham*
8. *Dhaathryaadi ghrutham*
9. *Naagabalaadi ghrutham*
10. *Thikthaka ghrutham*
11. *Jeevanthyaadi ghrutham*
12. *Mahathikthaka ghrutham*
13. *Indukaantham ghrutham*
14. *Ikshudurvadi ghrutham*
15. *Panchamoolaadi ghrutham*

CHEMISTRY OF ARISHTA AND AASAVA

The arishtas and asavas are the two complicated ayurvedic medicinal formulations. They are alcoholic fermented preparations produced using microorganism in a sugar/ jaggery/ honey/ grape/ fruit base. It is a complicated biotechnological process developed by ancient Indians. In arishta preparations, the alcohol formed during the fermentation slowly but steadily extracts the active principles from the powdered drug mixtures or extracts. Since the duration of fermentation is long, sufficient time is available for the concentration of the active principles in the solution

There are a number of parameters which are to be strictly followed to avoid the contamination of the products and to keep the curative efficacy of the final product. The most important among these parameters is to examine that all the drug components are free from contaminating pathogenic organisms, which can be easily crept into anyone of the raw materials, sugar, honey or jaggery.

The raw drugs should have required level of fineness so that the alcoholic solvent can penetrate into the cells breaking open the cellular membranes to extract the active principles. The temperature of the fermentation should be kept at 39 - 41° C for efficient fermentation.

The vessel used for each unit operation should be clean with sufficient aeration. The 'foreign microorganisms' should strictly be prevented, failing which the product may contain deleterious fermented products like aldehydes and ketones. Correct pH is to be maintained to see that beneficial microbes are not destroyed and deviated from its expected role of producing alcohols. During fermentation nitrogen is to be fed so that the protein will be available for the microbes. Frequent removal of the fermented product give better aeration and stabilized pH, salts, etc for exuberant growth of organisms resulting in quality products.

In general the powdered drugs are mixed with required quantity of water and mixed with jaggery, sugar and honey. In some cases a part or whole of the drugs is boiled to get more medicinal extracts which is used as the source/ starting material for the fermentation.

The Common Arishtas and Asavas described in Sahasra Yoga Test Book

1. *Dasamoolaarishtam*
2. *Amruthaarishtam*
3. *Kutajaarishtam*
4. *Draakshaarishtam*
5. *Abhayaarishtam*
6. *Balarishtam*
7. *Devadaarvaarishtam*
8. *Asokaarishtamjeerakaarishtam*
9. *Khadirashtam*
10. *Karpoorasavam*
11. *Pippalyaaadi asavam*

12. *Punarnavaasavam*
13. *Usiraashtam*
14. *Aravindaarishtam*
15. *Patrangaasavam*

CHEMISTRY OF LEHAS/ LEHYAS /RASAAYANAAS

The lehyas and Rasayanaas are semi solid, generally, pasty materials having both nutritious and curative effects. The product is generally prepared directly from the drug components after powdering them or cooking. The cooked/ powdered materials are mixed with jaggerry and heated slowly for a long time. The final product should have a semisolid/ solid honey type texture and appearance. Ghee, honey, spices etc are also added to the lehya / rasayana at the end of the preparations.

The active principles present in the raw drugs, with or without hydrolytic and pyrrolitic chemical changes get dissolved in the jaggery based rasayanam. Here the starch, protein and also the fat present in the raw materials give texture for the rasayana. Due to the presence of excess sugar of this product, faster absorption of the active principles may be taking place in the biological system because the sugar is known to get absorbed faster . However, available literature gives less information on the clinical study results on the active principles based curative effects of the lehya/ rasayana. Heat and water based changes of the rasayana / lehyas are inevitable because the final products are heated for a long duration for getting the actual paste like product. Inorganic chemicals/salts are also sometimes added as directed in rasachikitsa texts.

Lehas and Rasayanas given in Sahasra Yogam

1. *Vilwaadileham*
2. *Kooshmaanda leham*
3. *Maanibhadra leham*
4. *Manibhadragulam*
5. *Pinchaadileham*
6. *Draakshaaadi leham*
7. *Thippalaadi rasaayanam*
8. *Thiruvruthaadi leham*
9. *Sataavarigulam*
10. *Aswagandhaadi leham*
11. *Ikshuraadi leham*

12. *Madhusnuhi rasaayanam*
13. *Vyoshaadi rasaayanam*
14. *Dasamoolaadi leham*
15. *Chitrakagulam*
16. *Agastyarasayanam*
17. *Kalyaanavaleham*
18. *Dantihareetakee leham*
19. *Madanakaameswara leham*
20. *Kutajaavalehyam*
21. *Lavangamaodakam*
22. *Kanchataavalehyam*
23. *Dasamoola gulam*
24. *Vyaaghraadi lehyam*
25. *Amruthagulgulu lehyam*
26. *Punarnavaadilehyam*
27. *Gandhakarasaayanam*
28. *Bhangeesarkara lehyam*
29. *Chyavanapraasam lehyam*

CHEMISTRY OF GULIKA/ TABLETS YOGA.

As in the modern medicines, the use of tablets or gulika is common in the ayurveda from time immemorial. Generally the spherical tablets were prepared by hand in olden days. However now a days the ayurveic tablets resemble the modern medical tablets in size, shape and packing.

The starting material is almost similar to the choorna preparation. The choorna is mixed with a liquid or ghee/honey/lemon juice/boiled water/ jaggery paste/salt/etc, and then converted into gulika by hand or by machine.

All the parameters advocated for the choorna preparation can be followed for the production of gulika too unless otherwise specified. The raw drugs should be clean, free from microorganism, deleterious materials, sufficiently coarse or fine after grinding and sieving. Generally the gulika will have very small size having diameter ranging from few millimeter to one or one centimeter and a half. The gulika can be consumed directly with water or after grinding and mixing with water.

THE COMMONLY USED GULIKA MENTIONED IN SAHASRA YOGA

1. *Sooryaprabha gulika*

2. *Neelimoolaadi gulika*
3. *Mrudvikaadi gulika*
4. *Jwraankusam gulika*
5. *Ramabaanam of various types*
6. *Vaayugulika*
7. *Sethubandham gulika*
8. *Jaatikyaadi gulika*
9. *Paandivinu gulika*
10. *Nirooryaadi gulika*
11. *Vilwadi gulika*
12. *Kotaasarigulika*
13. *Kasturi bhooshanam gulika*
14. *Bhoopati gulika*
15. *Ananda bhairavam gulika*
16. *Naagaarjunam gulika*
17. *Neervaalasuddhi gulika*
18. *Mareechaadi gulika*
19. *Dantibeejaadi gulika*
20. *Raajavierachana gulika*
21. *Jwaraankusam gulika*
22. *Mahaajwaraankusam gulika*
23. *Seethanagaankusam gulika*
24. *Sarvajwaraharam gulika*
25. *Anandarasam gulika*
26. *Thaapajwaraharam gulika*
27. *Srvarogakulaanthakam gulika*
28. *Rogathrayaari gulika*
29. *Chandabhaskaram gulika*
30. *Neelakantarasam gulika*
31. *Gaganeswaram gulika*
32. *Jaatilingaadi gulika*
33. *Prchanda rasam gulika*
34. *Agnikumara rasam gulika*
35. *Sree sannipaata mruthyunjaya rasam gulika*
36. *Jwaramuraari rasam gulika*

37. *Soolakattaram gulika*
38. *Gulmakulanthakam gulika*
39. *Kanakasundaram gulika* '
40. *Trigunarasam gulika*
41. *Thrilokyachintamani rasam gulika*
42. *Virechana gulika*
43. *Aanthrakutaaram gulika*
44. *Vasthyaamayaanthakam gulika*
45. *Marmagulika*
46. *Sirasthyodagulika*
47. *Poornachandra rasa gulika*
48. *Dasaangagulika*
49. *Bhiarudra rasam gulika*
50. *Soothikaari rasam gulika*
51. *Garbhachintaamany rasam gulika*
52. *Pradarari rasam gulika*
53. *Sleepadanthakarasam gulika*
54. *Aamavaathaari rasam gulika*
55. *Naraayanarasam gulika*
56. *Soolaanthaka rasam gulika*
57. *Bahumootraanthakarasam gulika*
58. *Hemanaatha rasam gulika*
59. *Mahaanandarasam gulika*

Speciality of Ayurveda.

- Ayurveda is a traditional science for treating the patients equipping the body for fighting the diseases or physiological abnormality.
- Ayurvedic drug preparation processes have traditional technology and traditional message in them
- In the ayurvedic drugs, not only the active principles play the curative role but also other principles have very important role in building the health of the patient, for preparing the body to fight against the health problems.
- It may not be the same active principle in the raw drug working in the body when the kashaya, lehya, ghrutha and so on, are prepared from the raw drugs.

- Multiple chemical changes are possible in the final drug formulations/ products when raw drugs are heated/ processed at various temperatures, for different duration, with or without other (raw drug) ingredients.
- Pyrolitic and hydrolytic changes are taking place in majority of the processes at various conditions adopted for the production of the drugs.
- Maturity, storage, stage of collection, processing,....etc (in short each and every unit operation) will influence various components of the raw drugs and also the final products.
- Tracing one active principle in the raw drug may not be a very effective method to understand ayurveda, because the curative action may be due to the aggregate molecules of different nature, some of them may even be artifacts (newly created during the processing.)
- Arriving at a 'standard' for the formal products, may not be possible by tracing the analyzing methods adopted for modern drugs. It may be possible to some extent only by adopting the a pathway to arrive at the quality of the products prepared by traditional methods and comparing it with the market samples .
- However, quality of the drugs produced by adopting modern technologies and those of the traditional products can be compared using modern technologies/ analytical tools/ instruments/ physico-chemical methods, etc
- Products prepared using the traditional raw drugs may give a product having different composition from that produced using the extracts of the respective raw drugs.
- The health conditions/ age/sex/body conditions etc., of the patients will have a strong bearing on the action of the ayurvedic drug on different patients. Hence in ancient times, drugs were prepared according to the health, age, sex, physiological conditions, etc of the patient. Rarely the same product is prescribed for all type patients having the same / similar diseases, even though the name of the drug will remain the same (composition may significantly vary).
- The clinical studies adopted for the modern drugs cannot be duplicated for the ayurvedic drugs, because in the former generally a single chemical, is present Tracing a single component from a multiple drug system is not possible in ayurveda.

- The thridosha siddhanta and its applications are the core of ayurveda, whereas in the modern medicine such principles are not significant nor existing.
- Pathyas are important in ayurvedic treatments
- Not merely curing a disease but improving the health is the prime target of Ayurveda.
- Destroying the pathogenic organisms is not sometime adopted but preparing the body to accomodate the pathogenic organism is also one of the targets.
- Antibiotics type of drugs are rarely used even though excellent knowledge on the pathogenic organism existed.
- Even though not adopted now a days, astrological parameters were also used in olden days for treating a patient.
- Spirituality and faith for the physicians are two important criteria adopted as the part of the healing.
- A strong feeling that ' I am going to become alright' is given through different customs and rituals to the patients, in Ayurveda.
- Always positive thinking and optimism are the other two conditions stressed in ayurveda.
- Thus Ayurveda is Ayurveda which cannot be compared with any branch of existing medical science. Even translation of Sanskrit ayurvedic words into English is giving wrong messages and meanings. It is only natural that there may not be appropriate words in English to explain Ayurveda. Under such confusing situation only Sanskrit words should be used. Knowledge of many other parameters described in other Indian literature will be a great support to know Ayurveda theoretically and practically.

SCIENTIFIC UNDERSTANDING OF DIFFERENT ASPECTS OF ANCIENT INDIAN KNOWLEDGE

I. Various Ancient Indian knowledge are being systematically subjected to research, for their direct or indirect applications. They are also being examined for new ideas, products, processes, etc world over. The results of such studies are important to feel a sense of pride that our forefathers could discover them. We should take these messages to the scholars, scientists and thinkers world over. We have to make use of these knowledge, integrate them with the modern knowledge and make them suitable for

the present and future generations. Few among such points are given below.

a. *Yoga* has been accepted as 'an important tool for reducing tension and improving physical and intellectual efficiency. It has been estimated that 64% of the people of US above the age of 50 are practicing yoga in one form or other. In European countries and other developed countries too Yoga has become a part of the daily routine in commercial, academic, medical, social and school curriculum.

b. *Yogasanas* are replacing the strenuous physical gymnastic exercises in many countries. This is being practiced by people of all age for physical and mental relaxation. Many of the second world war victims and soldiers are given exposure in yogasana to relieve their psychological problems. It has also been proved that yogasanas give smooth and harmonious relaxation to the skeletal joints, makes the blood flow free and also remove the flow blocks in the blood vessels.

c The *pranayama*, the breathing exercise, has become one of the best medicineless treatment for relieving tension and reducing the psychosomatic problems (as described by Prof. Dean Ornish). It normalizes the heart functioning, adrenalin level in blood, blood pressure and calms down the mind, as the modern researchers proved.

d. *Soorya namaskara/* Sun salutation has become the part of the New Age Therapies. This can provide smooth and harmonious exercise for the movable skeletal joints and muscle fibers. There are seven different yogasanas in each Soorya namaskara which are practiced slowly and steadily in ten steps. Performing five soorya namaskara is equal to 35 yogasanas says the holistic medicine departments of the medical colleges.

e. Many emeritus professors explain, *Dhaarana dhyaana samaadhi* (known as *samyama*) are good methods for the internal (mental) analyses of the external factors. Through this method our Rishies could find out many external scientific and universal truths. They used their mind and brain as laboratory and samyama as the instrument for experimentation.

f. 'Vegetarianism' in its true spirit is *ahaara suddhi*. Now it is spreading world over. In US, it is estimated that nearly 20 % of the students are giving up beef and changing to veg., every year. The 'V restaurants' are fast spreading world over. Thus the interest in vegetarianism is increasing.

g. Variety of Indian foods are attracting millions of people when the non vegetarian foods are getting replaced . Prof. Vin Berg's research

results are the best guiding factors in this line on the nutritional aspects of Indian veg food and he points of the problems connected with non veg..

h. The concept of using plant based medicinal constituents (the products like turmeric, sweet neem , spices, coriander leaves, ginger, mustard, etc) in Indian foods is attracting the attention of food scientists. These contribute for the flavors and for medicinal effects. The idea of using 'medicines as food' (medicinal plants) is common only in India says the food specialists.

i. Fiber rich traditional Indian foods are becoming the choice of the day to reduce the intestine cancer, cholesterol problems, etc. Fibre rich bread, pan cakes, sandwiches, etc carry higher price.

j. Mantras and music/songs (with *sruthies)*, can change the brain and body chemistry. The 'mantra therapy' and 'car cassettes of mantras' are common words used now a days. The mantras and music can reduce the psychological sufferings and the pain of cancer patients – proved by Dr. T. Temple Tutler of Cleveland University, USA.

k. There are many Organizations and Music Therapists Associations imparting training for the utilization of *manthras* and different *ragas,* as mentioned in ancient Indian texts. The psychological and physiological effects of *manthras* in students during studying have been well documented. The *Bhagavath geetha* chanting could even change the pattern of students' behavior as proved Education Psychologists in US.

l. Quantum healing techniques are now directly linked with *manthras* and also with some of the Indian customs. The effect of the sound waves in the brain – neuro -linguistic and psycholinguistic effects are applied in psychosomatic treatments.

m. Bio medical Journal of USA has published the physiological effect of *manthras* and *pranayama* and their relation on cardio vascular rhythms. The CSIR Jounral has published effect of certain mantras which is reported to be equal to yogic exercises.

n. Dr. Henry Marshal from the Texas Research Institute in Clinical Psychology has selected a few mantras from Vedas for healing physiological/ psychological abnormalities

o. The '*Abhimanyu* effect' in the mental/ intellectual development of babies in the womb of the mother has been fully explained. It is so named from the story of Abhimanyu in Mahabharatha

p. The '*Hanuman* effect' - the application of motivation principles as

described in *Ramayana* has been analyzed particularly among the mentally depressed students.

q. The family bondage existing in India and the prayer like *maathru devo bhava, pithru devo bhava, achaarya devo bhava and athithi devo bhava* and other concepts are becoming important subject matter for anthropological and sociological studies in many universities

r.. The useful effects of *Gana Homa (Ganapathy homa)* can be explained now in scientific terms. (The sulfur content of the coconut husk, the phenols of the coconut shell and the coconut proteins, when burn produce respectively the oxides of sulfur, phenols and pyrazines which are well known anti-microbials. The smoke ejected is good for preventing some of the human and plant diseases caused by pathogenic organisms.

s. Cosmic dance of Siva has been taken as the dance of the Universe, celestial bodies and the sub atomic particles as explained. This is the subject matter in physics as given in the book by Dr. Fritjoff Capra, The Tao of Physics.

t. Color therapy/ solar therapy/ light therapy are practiced as the new age therapies for activating the *shad chakras/* energy centers in the spine and brain. The chakras have become a subject for study human body, particularly using image photography.

u. The discovery of Kirlian photography, GDV, etc has thrown light for the in-depth understanding of the Indian knowledge on various aspects of mind and body. The study results of Prof. Korotkov, from University of Moscow give fantastic explanations on the yogic explanations of human body.

v. Hydrotherapy / water therapy has been accepted as one of the methods for the purification the blood and reducing its viscosity for smooth functioning of heart. The message of Jalapaana vratha can be seen printed in the medical slips in the Western medical stores.

w. *Vaastu* principles are accepted for building residential and commercial structures world over , particularly in developed countries. Almost 100% of the buildings in the Fairfield, of Iowa State have Vastu parameters which fetches higher prices even though cost of construction is less.

x Sanskrit language is attracting the attention of scientists and language scholars. Thousands of Indian manuscripts are being screened for new knowledge . MIT of US has their own Sanskrit courses for graduation level. The language is also being studied for computers.

y. The astrology is being utilized in analyzing the personality of individuals,

through a different angles for various purposes, from health to business.

z. Indian technological heritage in metallurgy, civil engineering materials, ceramics and glass, surgical instruments, textiles, etc are drawing attention of the world class scientists and technologists. Some of these knowledge alredy got patented, in other countries.

II. THE AYURVEDA: The scientists are adopting the methods, products, processes and techniques which are practiced in Ayurveda.

1. The concept, of ayurvedic medicines that the aggregate molecules either present naturally or formed during the processing are the active principles for curing the diseases instead of isolated single molecules, is being well accepted.

2. When ayurvedic drugs are processed in presence of different other drug components, the artifacts formed may have better curing properties than original drug components is also being a subject of importance, which is becoming the subject matter of Patient Oriented Drug concept.

3. The mind - body combination, for improving and maintaining perfect health has already become part of modern sciene as said by Maharshi Charaka. – *saareera manaso yoga parasparam.....aadhaara aadheya bhaveena..*

4. The effect of faith and trust on physician and medicines has a better or equal curation efficacy to the quality of medicines is being accepted.

5. Use of multiple drug components and multifacial known or unknown molecules to get a specific combination with or without chemical modifications, instead of single type drug used as extracts or synthetic products is becoming a subject of great interest.

6. Appropriate use of even poisonous drugs for curative effects – *yogaadapi visham theekshnam.....*- has been well accepted even when the scientists talk about heavy metals in ayurvedic drugs.

7. The principle of *ushnam ushnena saanthi seetham seethena saanthi* is becoming one of the choices in modern medicines too. In fact the vaccination and inoculation are working in this principles

8. The principle of *pathyaas* and controlling food / day to activities / rest / etc has been implemented even in counseling centers and hospitals. The advise that the patient should take only soft food / rice gruels / steam cooked food / no curd / no fruits / controlled food / barley water / etc were not part of modern medicines. They are taken from Indian concepts

9. Treating the body is focused, instead of treating the diseases – *Sareeramaadhyam khalu dharma saadhanam* is becoming the 'new idea' in modern medicine. Rejecting the medicines have deleterious side effects, adopting the organic foods and natural products are examples.

10. Approach of physicians (towards the patients) *maithree kaarunyamartheshu* ..... for confidence building in patients is being appreciated. Informing the patients bluntly about the negatives of the 'treatment' during and after investigation creates serious psychological problems in the patients, has been underhood no.

11. Effect of spiritual and social factors in the treatment has been accepted by the modern science, as mentioned *naro hithaahaara vihaara sevee*.......

12. *Yama and niyamas* described as the first two steps in ashtanga yoga, are attracting the attention of those who are suffering from various mental and physical disorders. They are *ahimsa satyam astheyam brahma charyam aparigraham soucham santhosham thapa swaadhyaam eeswarapranidhaanam.*

13. The message of Bhagavath geetha 'that there are three qualities in every human beings and also in everything connected with human beings *sathwic- raajasic and thaamasic* has become a subject of modern psychology.

14. Holistic health approach has become a subject in the curriculum of almost all the medical colleges. This includes Indian approaches and messages on health.

15. Drug oriented patient (DOP) to patient oriented drug POD is becoming the latest western idea of medical system, which is the basic principle of ayurveda.

16 Hundreds of drugs and ayurvedic treatment methods are now being accepted and adopted in developed countries. Ayurveda is becoming the best alternative for the modern systems.

17. It has been recently reported that in Kerala, the Medical college Neurology department is collaborating with Ayurveda college for developing novel integrated treatment methods even for serious neurological problems, which as such may not be possible to treat with modern medicines.

18. Physiotherapy is a past of ayurveda. Now it has been adopted in medical systems as of physiotherapy.

19. Hundreds of ayurvedic hospitals, pancha karma centers, yoga centers

and nursing homes are sprouting in European countries adopting the ayurvedic knowledge.

20. Health tourism has become a great business in India particularly in Keralam. Focusing is on Ayurvedic treatments, hospitals and yoga centers.

21. Many Yoga and ayurvedic principles are becoming the part of medical curriculum in Denmark, Germany, Australia and in a number of European countries. Simultaneously Ayurveda colleges are also coming up in these countries.

22. There are schools in US where the students are given the choice of their courses based on their *vaata, pitta and kapha prakruti.* (nature)

23. Hundreds of foreign students are enrolling for learning Sanskrit, in Indian universities. It is mainly for translating the traditional Indian health books to their language. One of the students taken the degree in Ayurveda College from Kerala has been appointed as the CEO of the proposed Ayurveda university in US.

24. Pancha gavya part of Ayurveda has become one of the best bio pesticide in many spices and agroproducts.

There are many more points of ayurvedic principles which can further be described here, which are becoming the approved concepts of modern science and also many of these are adopted with modern medical systems.

In short even the three *saanthi (om saanthi saanthi saanthi)* chanted at the end of a mantra clearly gives the final solution for all the human physiological and psychological problems ; the ***aadhyaatmika saanthi aadi bhouthika saanthi, adhi daivata saanthi*** – peace in body, peace in the surrounding environment and peace in the celestial and terrestrial bodies to attain ultimate peace. This is the Indian approach in every aspect of human life.

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VEDA PRACHARANA VARSHAM

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